CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC

FIRE DEPARTMENT ANALYSIS REPORT

City of Tooele, Utah

Final Report–March 2022

CPSM®

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ICMA

Exclusive Provider of Public Safety Technical Services for
International City/County Management Association

THE ASSOCIATION & THE COMPANY

The International City/County Management Association is a 103-year old, nonprofit professional association of local government administrators and managers, with approximately 13,000 members located in 32 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments and their managers in providing services to its citizens in an efficient and effective manner. ICMA advances the knowledge of local government best practices with its website (www.icma.org), publications, research, professional development, and membership. The ICMA Center for Public Safety Management (ICMA/CPSM) was launched by ICMA to provide support to local governments in the areas of police, fire, and emergency medical services.

ICMA also represents local governments at the federal level and has been involved in numerous projects with the Department of Justice and the Department of Homeland Security.

In 2014, as part of a restructuring at ICMA, the Center for Public Safety Management (CPSM) was spun out as a separate company. It is now the exclusive provider of public safety technical assistance for ICMA. CPSM provides training and research for the Association's members and represents ICMA in its dealings with the federal government and other public safety professional associations such as CALEA, PERF, IACP, IFCA, IPMA-HR, DOJ, BJA, COPS, NFPA, and others.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service as when it was a component of ICMA. CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and align department operations with industry best practices. We have conducted over 420 such studies in 46 states and provinces and over 300 communities ranging in population from 8,000 (Boone, Iowa) to 800,000 (Indianapolis, Ind.).

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SECTION 1. INTRODUCTION

The Center for Public Safety Management (CPSM) was retained by the City of Tooele, Utah, to complete a comprehensive analysis of the city's fire services. This analysis is designed to provide the city with a thorough and unbiased review of fire services provided by the Tooele City Fire Department (TCFD). This report documents this analysis, and includes our findings and observations, a comprehensive data and community risk analysis, and recommendations structured to improve services and move the department forward.

During our study, we analyzed operational, administrative, and performance data provided by the TCFD, and we also examined first-hand the department's operations. CPSM found the TCFD to be open and transparent about its operations. Officers and members with whom the project team interacted were passionate about their volunteer service to the community. In fact, CPSM did not encounter a single member who was not enthusiastic about what they do with regards to the TCFD and the community. All TCFD members are to be commended for their volunteer service and their commitment to the citizens of their community.

The project team conducted an on-site visit on January 24 and 25, 2022, for the purpose of observing fire department and agency-connected supportive operations; interviewing key fire department and city staff; examining the city's building, rail, and transportation risks; and reviewing department operations. Virtual and phone meetings were held throughout the study with senior fire staff and the Mayor's office where CPSM project staff could affirm project information and elicit further discussion regarding our administrative and operational analysis.

A component of the on-site visit included two stakeholder meetings with TCFD department members. The first (January 24, 2022) was with active and senior members of the department and also included the Mayor and her staff. The purpose of this meeting was to inform the members about the study, answer their questions, and engage in a discussion about the department. The second stakeholder meeting (January 25, 2022) included current officers of the TCFD. The purpose of this meeting was to discuss the operational and response aspects of the department. Discussion also included the fleet, facility issues and locations, fireground accountability, radio communications, equipment, training, and past budget requests.

The CPSM project team, while reviewing information and discussing operations with department members, always seeks first to understand existing operations, then to identify ways the department can improve efficiency, effectiveness, and safety for both its members as well as the community it serves.

A significant component of this analysis is the completion of an All-Hazard Risk Assessment of the Community. The All-Hazard Risk Assessment of the Community contemplates many factors that cause, create, facilitate, extend, and enhance risk in and to a community. The risk analysis conducted by CPSM for Tooele considers the impact of each risk or factor utilizing a three-axis approach. The three-axis approach to evaluating risk includes the ***probability*** of the event, ***consequences*** to the community, and ***impact*** on the organization, in this case the TCFD. Factors that are discussed in the risk assessment are:

- Population and demographics.
- The environment.
- Buildings located in the city (the built upon environment).

- Transportation to include road, rail, and mass transit.
- Targeted building/occupancy hazard.
- Fire- and EMS-related risks.
- Incident demand.

CPSM measured and reported on these risks individually and as a whole.

Other significant components of this report are an analysis of the Community Risk Reduction component of the department, member training and education, optimal facility location for a more favorable deployment of department resources, current deployment of resources and the performance of these resources in terms of response times and the single TCFD fire management zone; response patterns; department resiliency (ability to handle more than one incident); critical tasking elements for specific incident responses; and assembling an effective response force. CPSM analyzed these items and is providing recommendations where applicable to improve service delivery and for future planning purposes.

In summation, a comprehensive risk assessment and review of deployable assets and operational response culture and activities are critical aspects in determining how prepared a fire department is and how it will react when the alarm comes in. First, these reviews will assist the TCFD in quantifying the risks that it faces. Second, the TCFD will be better equipped to determine if the current response resources are sufficient, equipped, trained, and optimally positioned. The factors that drive the service needs are examined and then link directly to discussions regarding the assembling of an effective response force and when contemplating the response capabilities needed to adequately address the existing risks, which encompasses the component of critical tasking.

The CPSM project team identified a number of area that need to be addressed by the TCFD and the city, and which resulted in our recommendations These are:

- The TCFD needs to strengthen its administrative, operational, training, and program-related guidelines and oversight.
- The department needs to complete and review its required record keeping such as fire reports and training records.
- There is a need to address fire facilities, optimum facility locations, and what resources are deployed from each facility.
- The department and city need to address the TCFD's aging and aged-out fleet.
- The department must address the training, education, and state fire certifications for firefighters, officers, fire instructors, fire inspectors, and those participating in and leading special operations.
- The department needs to address the inconsistent manner in which it performs fire code inspections from year to year.
- Deficiencies in the 2020 Insurance Services Office's Public Protection Classification report must be addressed.
- The TCFD must ensure that it can assemble an Effective Response Force to perform critical tasks on the fireground as benchmarked against the National Fire Protection Association (NFPA) 1720 standard.

- There is an immediate need to address the lack of formal, policy-driven, emergency scene accountability through a coordinated effort led by the Incident Commander and in accordance with national standards.
- There is an immediate need to strengthen the ability for all on-scene personnel to communicate or be with a crew who can communicate with the dispatch center, incoming units, and Incident Command.

In the conclusion section of this analysis, CPSM provides additional information on each of the areas the CPSM project team has identified that need to be addressed by the TCFD and the city, as well as a matrix of the recommendations in priority order that CPSM recommends the city and the TCFD follow as they move forward to address the areas of concern identified in this analysis.

This analysis contains a series of observations and recommendations provided by CPSM which are intended to help the TCFD deliver services more efficiently and effectively. CPSM recognizes there may be recommendations and considerations offered that first must be budgeted for, or for which processes must be developed prior to implementation. CPSM also acknowledges the recommendations may be adopted in whole, in part, or rejected by the department and city.

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RECOMMENDATIONS

Following is a summary of CPSM recommendations in the order in which they appear in this report. ***We provide our suggestions for the priority order of implementation of these recommendations on pages 107–112***.

Governance and Administration

(See discussion on pages 11–15.)

CPSM recommends the following regarding TCFD Standard Operating Guidelines (SOGs):

- The TCFD should label each SOG with the following information:
  - Date approved/implemented.
  - Date revised.
  - Fire Chief signature.
  - Label Operational SOGs as "O" with a corresponding SOG number (O-1, O-2, etc.).
  - Label Administrative SOGs as "A" with a corresponding SOG number (A-1, A-2, etc.).
- The TCFD should incorporate, where applicable, City Code of Ordinances in references.
- The TCFD should work with the city's Human Resources Director, Finance Director, and other city departments as appropriate and incorporate city human resources, fiscal policies, risk management, purchasing, and other guidelines as applicable into TCFD SOGs.

Facilities

(See discussion on pages 19–30.)

- CPSM recommends as a planning objective (over 1 to 3 years) that the city continue with its plan to construct a new Station 3.

CPSM further recommends the City review and consider the following fire facility alternatives to achieve optimal coverage in the city:

- The city construct Station 3 in its entirety and not in phases so that this station is fully functional when opened to meet current and future operational needs. CPSM recommends the TCFD deploy, at a minimum, a primary engine company and a primary ladder company out of Station 3, along with a primary engine company and a primary ladder company out of Station 2. In this scenario Station 1 is closed.
- The city should consider future fire facility planning and funding that relocates Station 1 south and west of its current location so as to provide deployment coverage to the south and west areas of the city. The city owns a parcel at the intersection of 1100 West and 200 South that will accommodate this facility. Once constructed and occupied, CPSM recommends the TCFD deploy at a minimum a primary engine company and a primary ladder company out of this location, a primary engine company out of Station 2, and a primary engine company and a primary ladder company out of Station 3. This configuration and deployment would provide optimal coverage of engine and ladder companies in the city. ***CPSM views this as the most effective three-station model alternative.***

- In the short- to mid-term while considering a relocation of Station 1, and if the city desires to maintain a three station model, CPSM recommends the city maintain Station 1 without extensive remodeling so as to provide service to the west and southwest portions of the city. CPSM recommends the TCFD deploy at a minimum a primary engine company out of this location, a primary ladder company out of Station 2, and a primary engine company and a primary ladder company out of Station 3 as this configuration provides optimal coverage of engine and ladder companies in the city in the short- to mid-term as the city considers a relocation of Station 1.

- If the city chooses not to relocate Station 1 and maintain a two-station fire department, CPSM recommends the city construct Station 3 in its entirety, remodel Station 1, and close Station 2 as an operational deployment station due to its proximity to Station 1. **This will achieve the most strategic two-station fire facility operational response coverage.** CPSM recommends the TCFD then deploy a primary engine company and primary ladder company out of each of the two stations (1 and 3). Under this model, Station 1 will require, if conditions allow, the construction of an apparatus bay (north side of structure) that will accommodate a ladder apparatus. Station 2 can be repurposed as a shop/training facility and fire department annex for the storage of training and reserve apparatus and equipment.

Fleet

(See discussion on pages 30–34.)

- CPSM recommends the TCFD and the city develop, over a one-year period, a fire apparatus replacement plan that follows apparatus age recommendations in accordance with NFPA 1901 standard, *Standard for Automotive Fire Apparatus*.

Planning objectives should include to the extent possible and based on funding:

- First-line apparatus should not exceed 15 years of service on the front line. Once an apparatus reaches this age, it should undergo a Level 1 refurbishing in accordance with NFPA 1912, *Standard for Fire Apparatus Refurbishing* (current standard) as a first alternative, or replacement if maintenance records and wear and tear warrant replacement.

- Apparatus in active/reserve status which is between 20 and 25 years old should comply with NFPA 1901 and undergo a Level 1 refurbishing in accordance with NFPA 1912 as an immediate planning objective if the department plans to continue to use this apparatus. All apparatus at the 25-year-old mark should be considered for replacement. Apparatus greater than 25 years old should be removed from service.

- Apparatus components which are either fixed or portable and which require annual testing—fire pumps, aerial ladder and aerial ladder assemblies, ground ladders, self-contained breathing apparatus to include personnel fit-testing, and fire hose—should be tested in accordance with manufacturer and industry specifications and standards, and proper records maintained at the department, the city and with the vendor.

- Based on the current age and condition of the TCFD fleet, CPSM proposes a fleet replacement plan as shown in the Table 3-4. This plan includes recommendations to remove two engine apparatus from service due to age, to replace one engine apparatus in the immediate future due to its age, to replace another engine in the next 12 to 24 months, and to refurbish one engine and one ladder over a 24 to 48 month period to gain more years of service for these two vehicles if mechanically sound and the bodies remain in good condition.

Training

(See discussion on pages 35–38.)

- CPSM recommends the TCFD Fire Chief work with the city Human Resources Director and draft and implement, over an immediate six-month period, a formal Standard Operating Guidelines for training that include:
  - Standard state fire certifications for combat firefighters to include: Haz-Mat Awareness, Haz-Mat Operations, Firefighter I, Firefighter II, Wildland Firefighter I, and Emergency Vehicle Operator Course to include operating brush vehicle apparatus.
  - Standard state fire certifications for members who drive and operate the heavy fire apparatus to include: All certifications for combat firefighter plus Apparatus Driver Operator-Pumper (for those who drive the engine apparatus) and Apparatus Driver Operator-Aerial (for those who drive the ladder apparatus).
  - Standard state fire certifications for first-line officers (Lieutenants and Captains) to include: All certifications for combat firefighter plus Fire Officer I certification and Wild Land Firefighter II certification.
  - Standard state fire certifications for Chief Officers (Fire Chief, Assistant Chiefs) to include: All certifications for combat firefighter and first-line officers plus Fire Officer II at a minimum.
  - Standard state fire certifications for Training Officers to include: All certifications for combat firefighter plus Fire Instructor I at a minimum. It is further recommended the lead Training Officer have Fire Instructor II certification at a minimum.
  - Standard state fire certifications for Fire Inspectors and Fire Investigators to include: All certifications for combat firefighter plus Fire Inspector I at a minimum for Fire Inspectors, and Fire Investigator I for Fire Investigators. It is further recommended the lead Fire Inspector or person designated as the Fire Marshal have Fire Inspector II and Fire Investigator I certification at a minimum.
  - The Training Standard Operating Guidelines should also address the standard state certifications for members who take the lead in technical rescue components such as Rope Rescue, Ice Rescue, Trench Rescue, Collapse Rescue, Vehicle Rescue, and Machinery Rescue.
- The Training Standard Operating Guidelines should outline aggressive implementation goals and dates for each section of these recommendations, making combat firefighter, fire inspector, and fire officer (in this order) certification training the priority over the next 18 to 24 month period. The Guidelines should also contemplate how to manage members in all positions who do not meet the training certifications, to include any stipend they may be receiving, and how these Guidelines link to the recruitment and retention of current and future members.

Community Risk Reduction

(See discussion on pages 38–42.)

- Community Risk Reduction is a city-wide public safety effort that includes fire prevention inspections and fire code enforcement, public safety education, and investigation of fires. The fire inspection program has certain state-and city-legislated requirements. As the department's current fire prevention inspection and fire code enforcement functions do not have a plan to meet the city's growing fire inspection demand and are not consistently

administered and managed as outlined in this analysis, CPSM recommends that the city hire a full-time Fire Marshal to lead and manage the Community Risk Reduction program. This program should include fire prevention inspections and fire code enforcement, the investigation of fires, and public fire education.

- In addition to formal education requirements deemed appropriate by the city's Human Resources Director commensurate with the position, the Fire Marshal candidate should have at a minimum the following Utah Fire and Rescue Academy state certifications when hired:
  - Firefighter II.
  - Officer II.
  - Fire Inspector II.
  - Fire Investigator.
- The Fire Marshal, once hired, should be required to obtain within 24 months the following Utah Fire and Rescue Academy state certifications:
  - Fire and Life Safety Educator I.
  - Fire Inspector III.
- CPSM recommends the Fire Marshal position be placed in the Community Development Department in the near term and until other recommendations in this analysis are evaluated and implemented.
- In conjunction with the hiring of a full-time Fire Marshal, CPSM recommends the city develop a fire prevention occupancy inspection plan in accordance with Chapter 5-1-8(2) of the City Code that specifies, by occupancy type and occupancy address, the frequency of fire inspections. The frequency of inspections should be either annual or bi-annual and based on the hazard or mechanical processes performed, life safety and vulnerability of the population in the occupancy, frequency of fire incidents, type of fire protection systems, and if it is a public assembly. The highest hazards and threat to life safety and vulnerable populations are recommended to be inspected annually and all others bi-annually. Included in this plan should be the initial inspection of businesses and occupancies issued a new Business License and those mandated by a state department to be inspected annually.
- CPSM further recommends the city maintain the cadre of part-time certified Fire Inspectors to assist the Fire Marshal in carrying out the fire inspection plan. It is also recommended the number of part-time Fire Inspectors be expanded to four and that at least two of these inspectors be certified by the Utah Fire and Rescue Academy as Fire Investigators so that trained and certified fire investigators are available to respond to TCFD fire incidents to determine the cause and origin of fires.

ISO Rating

(See discussion on pages 59–63.)

- CPSM recommends the city and the TCFD develop a joint plan to address deficiencies in the current ISO Fire Service Rating Schedule review that was effective June 2020 and as outlined here regarding Fire Department Deployment Analysis, Company Personnel, Training (Facilities and Use, Company Training, New Driver and Operator Training, Pre-Fire Planning Inspection), and Water Supply (Inspection and Flow Testing).

TCFD Staffing Model

(See discussion on pages 92–98.)

- CPSM recommends the TCFD adopt one or more of the response models outlined herein to ensure the most effective and immediate use of response resources and the safety of the public and firefighters. CPSM also recommends the TCFD develop a guideline that outlines the use of the Active911 wireless phone platform and make this system mandatory for all responders who have access to a wireless phone to ensure accountability of all responders. CPSM also recommends the TCFD migrates to a response model where apparatus responds with a minimum of three personnel, namely, a qualified driver/operator, an officer, and a qualified/certified firefighter as a platform for safety, greater on-scene effectiveness and accountability, and enhancement of assembling an Effective Response Force.
- CPSM recommends the TCFD immediately develop a personnel accountability guideline that incorporates individual and apparatus accountability tags as well as accountability boards in all apparatus and command vehicles. The personnel accountability guideline should incorporate language from NFPA standards 1720, 1500, and 1561.
- CPSM strongly recommends the TCFD develop a communications guideline that establishes no member may operate on the fireground alone, and all members must operate in a crew of at least two, of which one crew member must have a portable radio that is operating on the assigned tactical channel and is contact with the Incident Commander. It is further recommended each TCFD command vehicle have a bank of portable radios in addition to radios assigned to fire apparatus of sufficient numbers and that portable radios can be made available to responding volunteer members arriving in POVs to augment this communications guideline.

Mutual Aid

(See discussion on pages 99-101.)

- CPSM recommends Tooele City conduct a comprehensive review of all fire protection service agreements. This review should include the development of new agreements with municipal and special district fire departments that the city currently provides or receives mutual aid to and from where a mutual aid agreement does not exist. The new agreements should define service level response outside of a fire department's respective area and reciprocal equipment, or services for these fire protection responses and services the city will provide. CPSM further recommends that each agreement have a sunset date that will trigger review and updating to address changes in fire protection services in Tooele City and those municipalities and special districts the city has an agreement with.

Department Leadership

(See discussion on pages 104–105.)

- Based on the findings in this analysis that the city is a desirable place to live and will continue to grow with future residential and commercial development, and that the expected growth will increase response demand and bring new building and density risks to the city, and as the Tooele City Code codifies the TCFD as an administrative department of the city, and the Fire Chief position as a department head within the city government, and that the Mayor has direct supervision and responsibility over operations in the Fire Department, CPSM recommends the city consider hiring a full-time Fire Chief to lead and manage the TCFD.

- In addition to formal education requirements deemed appropriate by the city's Human Resources Director commensurate with the position, the Fire Chief candidate should have at minimum the following Utah Fire and Rescue Academy state certifications when hired:
  - Haz-Mat Awareness and Haz-Mat Operations.
  - Firefighter I and II.
  - Wildland Firefighter I and II.
  - Emergency Vehicle Operator Course.
  - Fire Officer I and II.
- CPSM does not recommend the minimization or deletion of the current succession of elected volunteer senior level officers (Fire Chief, Assistant Fire Chiefs) as these positions are needed to facilitate a contemporary fire department. What CPSM does recommend is the current Volunteer Fire Chief position be reclassified as the Deputy Fire Chief (Operations Chief) and the two Assistant Fire Chief positions remain intact. CPSM further recommends the full-time Fire Chief work with the Human Resources Director and develop job descriptions for these positions and all other officer and program positions the full time Fire Chief deems necessary while utilizing the certification recommendations already discussed in this analysis.
- CPSM also recommends if the city chooses to move forward this recommendation and the recommendation to hire a full-time Fire Marshal that the full-time Fire Marshal and his/her staff be included in the fire department and report to the full-time Fire Chief.
  - An alternative to hiring two full time positions (Fire Marshal and Fire Chief) is to combine the two positions into one. Under this alternative, The Fire Chief will also act as the City's Fire Marshal carrying out those job duties as well. The candidate should have the minimum education and Utah Fire and Rescue Academy state certifications for each position as outlined herein.

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SECTION 2. AGENCY REVIEW AND CHARACTERISTICS

Department Overview and Organizational Structure

Established in 1919, the Tooele City Fire Department (TCFD) provides fire services for the City of Tooele, Utah. The department has been proudly providing these services as a volunteer agency for more 100 years. Services include fire protection, community risk reduction, public education, and community engagement functions.

The TCFD membership is budgeted for fifty-five active members, which includes the Fire Chief, two Assistant Chiefs (one serving as the Fire Marshal), line Captains, line Lieutenants, and line firefighters. There are also more than 50 senior members who continue to support the organization as well as an auxiliary support organization made up of more than 25 members.

The TCFD has established a vision, mission, and core values, as follows:

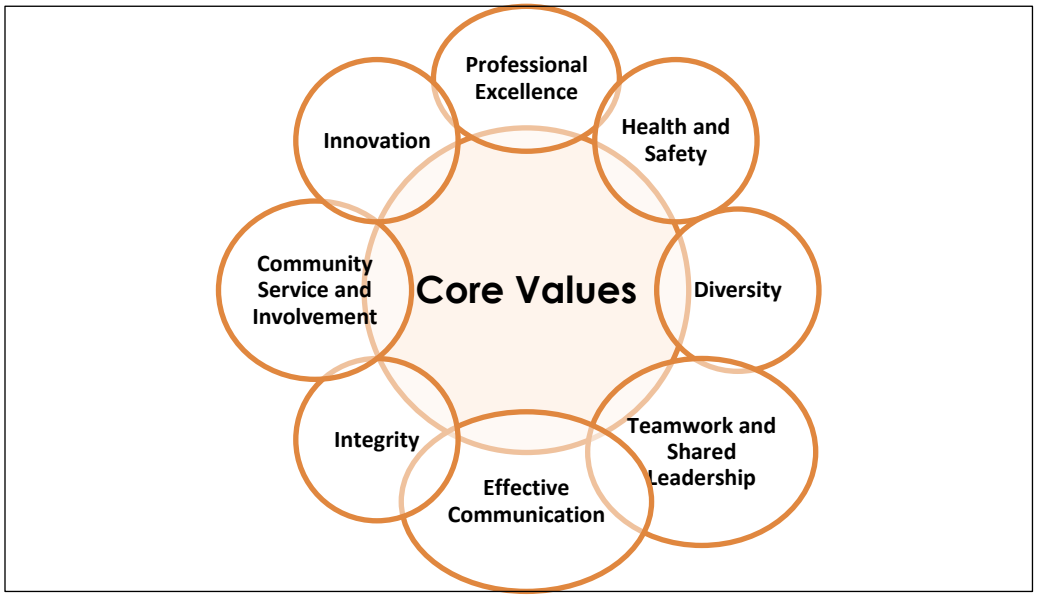
FIGURE 2-1: TCFD Vision, Mission, Core Values

VISION

We are dedicated to being the best community-focused volunteer fire department, working as a team to ensure a safe and secure environment for all those entrusted to our care.

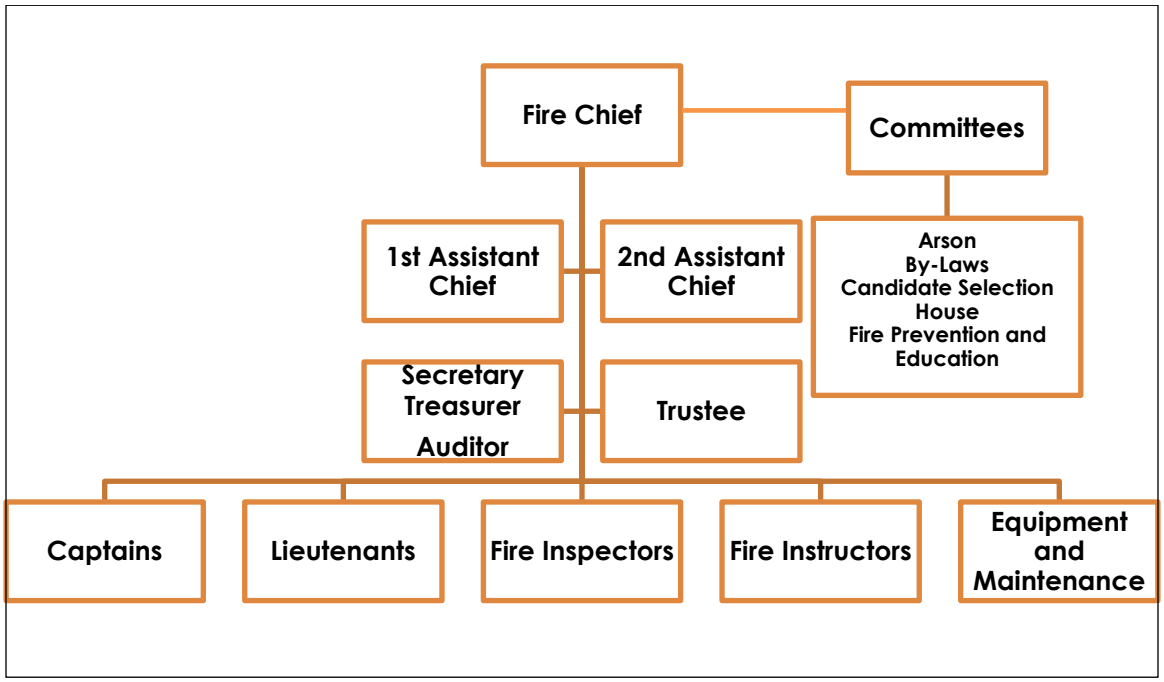
MISSION

We are committed to providing emergency and non-emergency services to protect the lives, property, and environment of our community.



The next figure illustrates the functional organizational chart for the TCFD.

FIGURE 2-2: TCFD Organizational Chart



Governance and Administration

The City of Tooele is governed under a home rule charter. While all other cities and towns in the state are governed under forms of government established by the state legislature, by voter referendum in 1965 the city established itself as a home rule charter city and therefore operates under its established rules of administration (not in conflict with the general law).[1]

Under the city charter, the elected City Council (Council) serves as the legislative body of the city. The elected Mayor serves as the Chief Executive Officer of the city. One member of the Council (as elected by the Council) serves as the Council Chairperson.

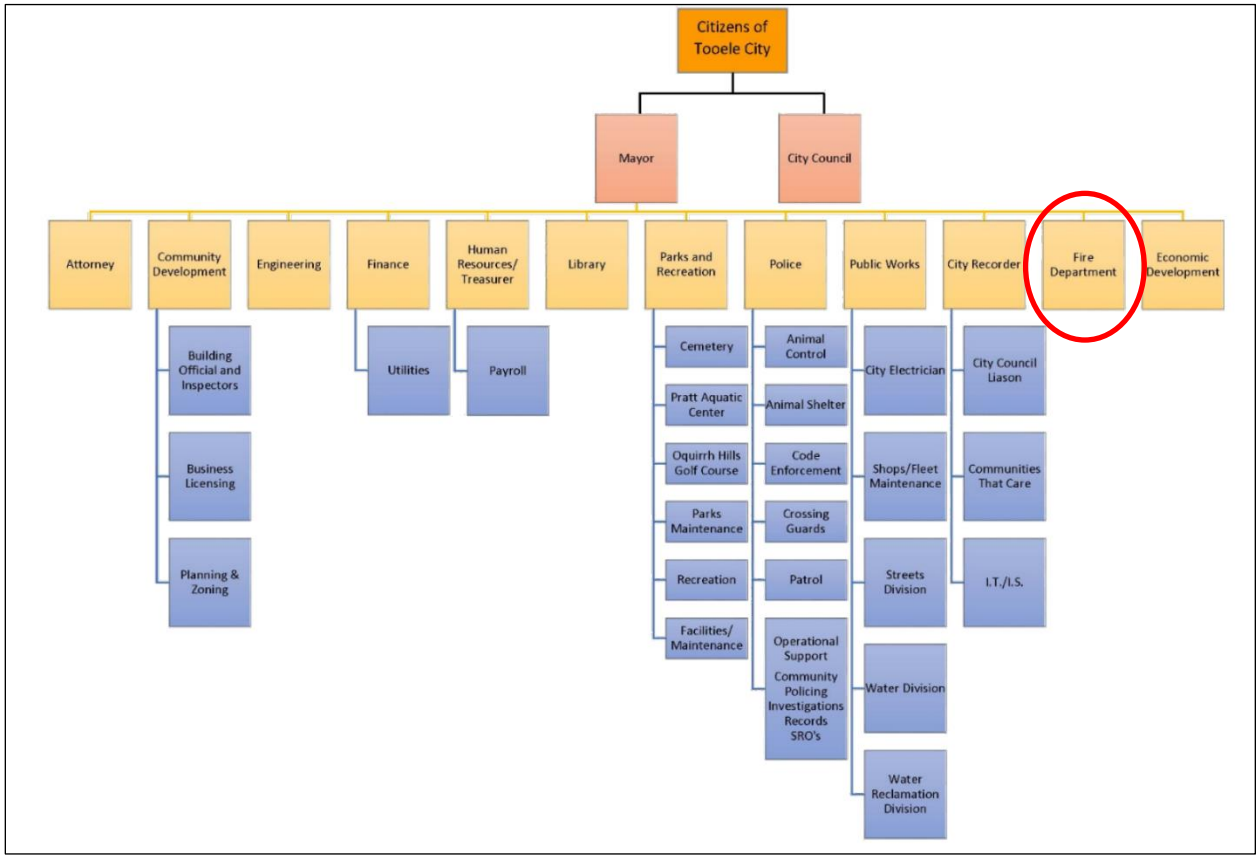
Section 2.06 of the charter establishes that the Mayor, with consent of the Council, shall appoint or designate department heads (or pursuant to Section 2-10 of the charter, remove a department head with consent of the Council). This includes the Fire Chief, who serves as the head of the fire department. Through Section 2-06 of the charter, the Mayor is charged with the responsibility to supervise all activities of city departments through each department head.[2]

Title 3-1-1 of the Tooele City Code establishes the fire department as a part of the Public Safety Department. Title 3-1-1 further establishes the fire department *shall consist of the Chief of the Department, one or more assistant chiefs, one or more chauffeurs or engineers and not to exceed fifty (50) men as call men who shall or may volunteer for such services and be accepted by a majority vote of the membership*.[3]

The next figure illustrates the city's organizational structure to show where the TCFD is slotted.

1 Tooele City Charter.
2 Ibid.
3 Tooele City Code.

FIGURE 2-3: City of Tooele Organizational Chart



Other significant Tooele City Codes that relate to the city's fire protection and community risk reduction include:

- **1-6-4(2): Powers Generally (Mayor)**, which states *the Mayor will have direct supervision and responsibility over operations in the Finance Department, City Attorney's Office, City Recorder's Office, Human Resources Department, Police Department, **Fire Department**, City Hall, Community Development Department, Public Works Department, Parks and Recreation Department, Information Technology Department, Economic Development Department, and other administrative departments as may be created or amended from time to time.*
- **1-6-4(4): Powers Generally (Mayor)**, which states *the Mayor will oversee the issuing of building permits, the inspection of buildings, plumbing, and wiring, subject to uniform codes adopted by the city.*
- **1-6-6: Officers**, which states *the Mayor shall appoint the following officers: city attorney, treasurer, police chief, fire chief, four members of the Planning Commission, all department heads except the city recorder, and members of advisory boards as provided by this Code, with the consent of the City Council, except as expressly permitted otherwise by the City Code or Utah Code.*
- **3-1-4: Duties and Powers of the Fire Chief**, which states *the duty of extinguishing fires and of protecting life and property is entrusted to the Chief of the Fire Department. He may divide the City into Fire districts and make such rules and regulations, subject to the approval of the*

Director of Public Safety for the government of all officers and members of the Department, as he may deem expedient. He may make suitable regulations under which the officers and members of the Department shall be required to wear an appropriate uniform or badge, by which, in case of fire and at other times, the authority and position in the Fire Department may be known. The Chief shall have the sole and entire command over all officers and members of the Department at fires. He shall have full charge at all times of all apparatus and appurtenances belonging to the Department, and he shall adopt such measures as he shall deem expedient for the extinguishment of fires, protection of property, or preservation of order and observance of the laws of the State, and for the enforcement of the duties required of him by law and the provisions of this Code. It shall be the duty of the Chief of the Department to inspect engines, hose and hook ladder equipment of the Fire Department.

- **3-1-5: Special Duties of the Fire Chief**, which states *it shall be especially the duty of the Chief of the Fire Department to see that at all times the provisions of this Code relating to the protection and regulations of property are strictly enforced, and also all provisions for the prevention of and the protection against fires*.
- **3-1-18: Investigation**, which states *the Chief (or in his absence, his assistants in charge of the fire), shall, after its extinguishment, make a prompt and thorough investigation of the cause of the fire, the time of breaking out, the amount of loss and insurance, a description of the affected buildings and premises, and shall secure all other useful information and data available, and record the same in a book kept for that purpose in the office of the Department and shall report the same to the Public Safety Director at such times as he may direct*.
- **3-1-27: Fires Outside City Limit**, which states *the Council may enter into cooperative agreements with the governing bodies of Cities, Towns and Counties of the State of Utah and in close proximity to the City to extinguish fires in any such areas outside the City limits of the City and may authorize the Fire Department under regulations established for that purpose to extinguish fires in such areas; and the City shall not be liable for any damage to persons or property resulting from firefighting equipment being outside the City limits pursuant to such agreements.*
- **3-3-2: Enforcement (of the Fire Code)**, which was amended at the February 2, 2022, City Council meeting and states *the "International Fire Code" and the "International Fire Code Standards" shall be enforced by the bureau of fire prevention in the Tooele City fire department in coordination with the Community Development Department*.
- **3-5-1: Local Fire Officer**, which states *this ordinance authorizes the Tooele City Fire Chief, as the local fire officer for Tooele City, to prohibit open fires and the use of any ignition source when hazardous environmental conditions necessitate controlling the use thereof*.
- **3-6-1: Purpose (Fire Code: Enforcement and Abatement)**, which states *the purposes of this Chapter include the protection of the public life, health, safety, and general welfare, and the implementation of City administrative procedures for the protection of the public life, health, safety, and general welfare through the enforcement of this Title 3 (Fire) and of the International Fire Code and through the abatement of violations of this Title 3 and of the International Fire Code*.
- **3-6-2: Declarations Regarding Violations of the Fire Code**, which states *it is hereby declared that violations of the Fire Code operate contrary to the purposes of this Chapter and constitute a threat to the public life, health, safety, and general welfare*.

There also exists the TVFD (Tooele Volunteer Fire Department) Association, an independent non-profit organization that is separate from the TCFD. This organization is established as a business entity to accept charitable donations, funds from fundraising activities and donated public funds from the City. These donated funds from Tooele City are reflected in the annual budget line item #142000 (Table 2-4 below) and is used for the purpose of morale, welfare, and social services; which directly assists in the recruitment and retention of volunteer members.

The TCFD also has Standard Operation Guidelines (SOGs) that primarily govern the operational response components of the department. TCFD Administrative SOGs cover those items typical in public service such as expected behavior in general of a member, behavior within the fire facility, uniforms, and chain of command. The current SOGs are mostly dated 2020, with some dated 2021. By this dating system, it cannot be distinguished if these are the original implementation dates or if these are revision dates. Typically fire department SOGs are numbered and further separated as operational and administrative in the title. TCFD's documents do not have this identification system. ***One strong point regarding the TCFD SOGs is that each has a reference listing of applicable fire service industry standards and benchmarks.*** By this, members gain a better understanding of the SOG and can research references for additional learning opportunities.

The department's operational and administrative SOGs are described in the following two tables:

TABLE 2-1: TCFD Operational Standard Operating Guidelines

Carbon Monoxide Detection	Incident Command System	Non-Emergency Vehicle Operations	Responding in Privately Owned Vehicles
Confined Space Rescue Operations	Knots and Hoisting Tools	Overhaul Operations	Rope Rescue Operations
Elevator Rescue Operations	Knox Box Procedures	Personal Protective Equipment	Rules of Engagement
Emergency Vehicle Operations	Ladder Operations	Positive Pressure Ventilation	Salvage Operations
Fire Investigation Operations	Live Structure Fire Training	Radio Communications	Structure Fire Operations
Haz-Mat Operations	May Day Command Operations	Rapid Intervention Teams	Thermal Imaging Cameras
Hose Testing	May Day Firefighter Operations	Rehabilitation	Trench Rescue Operations
Ice Rescue Operations	Mutual Aid	Relay Pump Operations	Vehicle Extrication Operations
		Water Rescue Operations	Vehicle Fire Operations

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TABLE 2-2: TCFD Administrative Standard Operating Guidelines

Department Ceremonial Procedures	Department Dress Uniforms	Fire Station House Rules
Department Chain of Command	Fire Service Standards	U.S. Flag Etiquette

Recommendations:

CPSM recommends the following regarding TCFD Standard Operating Guidelines (SOGs):

- The TCFD should label each SOG with the following information:
  - Date approved/implemented.
  - Date revised.
  - Fire Chief signature.
  - Label Operational SOGs as "O" with a corresponding SOG number (O-1, O-2, etc.).
  - Label Administrative SOGs as "A" with a corresponding SOG number (A-1, A-2, etc.).
- The TCFD should incorporate, where applicable, City Code of Ordinances in references.
- The TCFD should work with the city's Human Resources Director, Finance Director, and other city departments as appropriate and incorporate city human resources, fiscal policies, risk management, purchasing, and other guidelines as applicable into TCFD SOGs.

Note that there are several additional SOG recommendations throughout this analysis.

Fiscal Resources

The TCFD is funded primarily by the city through the general fund. Revenue in the general fund is generated from property tax and sales tax, as is typical throughout the country. Other revenues for TCFD are generated through a fee for fire inspections and a public safety impact fee assessment tied to new construction. The impact fee revenues can be applied to capital projects and equipment.

The city owns, insures, and maintains the fire department's fleet and facilities. This is a substantial burden the volunteer fire department does not have to shoulder, which allows members to focus on the administration and operation of the department and not on the constant fundraising efforts typical of many volunteer fire departments across the country. This also shows the commitment the city has regarding the provision of fire protective services.

The TCFD makes up about 2 percent of the city's general fund budget and is funded at $469,272 in FY 2022. Funding has remained stable for TCFD through recent budget years, with small percentage increase or decreases, which typically are dependent on certain one-time requests or other line item increases or decreases from year to year. For example, in FY 2021 the budget increased due to the purchase/replacement of a light vehicle and increases in training and facility operational lines. The next table illustrates the budget for the TCFD in fiscal years 2020, 2021, and 2022.

TABLE 2-3: TCFD Budgeted Amounts for FYs 2020, 2021, and 2022[4]

	Actual FY 6/2020	Estimated FY 6/2021	Budget FY 6/2021	Recommend FY 6/2022	Approved FY 6/2022
Fire Department (4222)					
Salaries & Wages	**89,857**	**92,015**	**89,136**	**97,566**	**97,566**
Benefits	**62,709**	**56,612**	**65,009**	**68,260**	**68,260**
Operating Expenditures	**313,929**	**248,419**	**380,297**	**303,447**	**303,447**
Total Fire Department	**466,495**	**397,046**	**534,442**	**469,273**	**469,273**

The TCFD line item budget is further broken down as described in the next table.

TABLE 2-4: TCFD FY 22 Line Item Budget

4222 / FIRE DEPARTMENT							
ACCOUNT NUMBER	DESCRIPTION	ACTUAL FY 6/2020	ESTIMATED FY 6/2021	BUDGET FY 6/2021	REQUEST FY 6/2022	RECOMMEND FY 6/2022	APPROVED FY 6/2022
121002	PAID VOLUNTEERS	89,857	92,015	89,136	97,566	97,566	97,566
131000	EMPLOYEE BENEFITS	10,397	10,779	10,317	13,838	13,838	13,838
132000	LIFE INSURANCE	13,670	13,212	14,727	14,727	14,727	14,727
141000	UNIFORM ALLOWANCE	7,017	4,652	8,000	10,200	10,200	10,200
142000	NONWAGE COMPENSATION	31,625	27,969	31,965	29,495	29,495	29,495
211000	SUBSCRIPTIONS & MEMBERSHIPS	899	2,213	1,500	1,500	1,500	1,500
231000	TRAVEL AND TRAINING	10,490	0	30,000	30,000	30,000	30,000
241000	OFFICE EXPENSE	236	785	1,000	1,000	1,000	1,000
252000	OPERATION & MAINTENANCE	36,006	43,022	35,000	45,000	45,000	45,000
271000	BUILDING OPERATION & MAINTENANCE	6,065	12,005	30,000	20,000	20,000	20,000
272000	GROUNDS OPERATION & MAINTENANCE			500			
281000	ROCKY MOUNTAIN POWER	4,711	2,315	4,000	3,000	3,000	3,000
282000	QUESTAR GAS	6,186	5,984	7,200	6,500	6,500	6,500
283000	TOOELE CITY WATER PURCHASES	1,110	1,110	1,110	1,110	1,110	1,110
283001	TOOELE CITY SEWER FEES	528	528	528	528	528	528
292000	WIRELESS COMMUNICATIONS	9,583	10,805	15,500	28,500	20,000	20,000
481000	SPECIAL DEPARTMENTAL SUPPLIES	31,084	44,315	32,680	45,000	45,000	45,000
486004	HOMELAND SECURITY GRANT EXPENSES	32,152		15,250			
610000	MISCELLANEOUS EQUIPMENT	44,109	10,803	30,000	30,000	30,000	30,000
741000	MACHINERY & EQUIPMENT	22,228	21,825	37,000	37,000	37,000	37,000
744000	OFFICE FURNITURE & EQUIPMENT			2,000			
748000	AUTOS AND TRUCKS (CHIEFS VEHICLES)	37,764	20,184	66,250			
911071	TRANSFER - FIRE DEPT TRUST FUND (71)	70,779	72,529	70,779	62,809	62,809	62,809
4222	TOTAL FIRE DEPARTMENT	466,495	397,046	534,442	477,773	469,273	469,273

While it is a volunteer department, the TCFD does have certain members who receive a stipend for performing specific duties beyond that of the regular member. These members are the Fire Chief and Assistant Chiefs, fire inspectors, training coordinator, facilities and fleet/equipment maintenance coordinators, and the department secretary. The following describes the stipend amount for each.

- Fire Chief (1) $334.56 biweekly $8,699 annualized
- Assistant Chiefs (2) $308.81 biweekly $8,029 annualized
- Fire Inspector (4) $190.47 biweekly $4,952 annualized[5]
- Equipment/Fleet (3) $272.82 biweekly $7,093 annualized
- Facilities Upstairs (1) $180.22 biweekly $4,686 annualized

4. Tooele City Adopted Budget Book-FY 2022.
5. The Fire Inspector stipend has been tolled by the Mayor due to issues identified herein with this extra duty to include training and consistency with completing inspections. The Mayor hired three certified Fire Inspectors on a part-time basis to carry out the requirements of Fire Prevention Inspections.

- Facilities Downstairs (1) $247.08 biweekly $6,424 annualized
- Secretary (1) $247.08 biweekly $6,424 annualized

Other allowances include cellular phones (7 phones: $3,360 annualized) and a Fire Chief miscellaneous allowance of $600/year. In total, TCFD stipends (with benefit costs), cellular phones and Fire Chief allowance total $192,900 in the current year.

The city also budgets for TCFD capital projects. Major capital projects funded include the replacement of Self-Contained Breathing Apparatus (SCBAs), lease payments on a new ladder truck, and the funding for the proposed new Station 3, which is discussed at length in another section of this analysis. The next table describes fire department capital funding for FYs 2020, 2021, and 2022.

TABLE 2-5: TCFD Capital Budget Plan, Fiscal Years 2020, 2021, and 2022

FY20		FY21		FY22	
Capital Projects Fund (41) - SCBAs	$333,792	Capital Projects Fund (41) – New Building (Allocated but Not Spent)	$300,000	Capital Projects Fund (41) – New Building (Less cost of study)	$2,300,000
Impact Fee Fund (45) - Ladder Truck Lease	$75,271	Impact Fee Fund (45) - Ladder Truck Lease	$75,271	Impact Fee Fund (45) - Ladder Truck Lease	$75,271
RDA Fund (75) – Ladder Truck Lease	$75,271	RDA Fund (75) - Ladder Truck Lease	$75,271	RDA Fund (75) - Ladder Truck Lease	$75,271
FY20 Fire Dept. Expenditures in other Funds	$484,334	FY21 Fire Dept. Expenditures in other Funds	$450,542	FY22 Fire Dept. Expenses Budgeted in other Funds	$2,450,542

CPSM has no immediate recommendations here regarding the budget for the TCFD. In other sections of this analysis we will put forth recommendations that will have an impact on the funding and budgeting of the TCFD in future budget years, should the city adopt these recommendations in whole or in part.

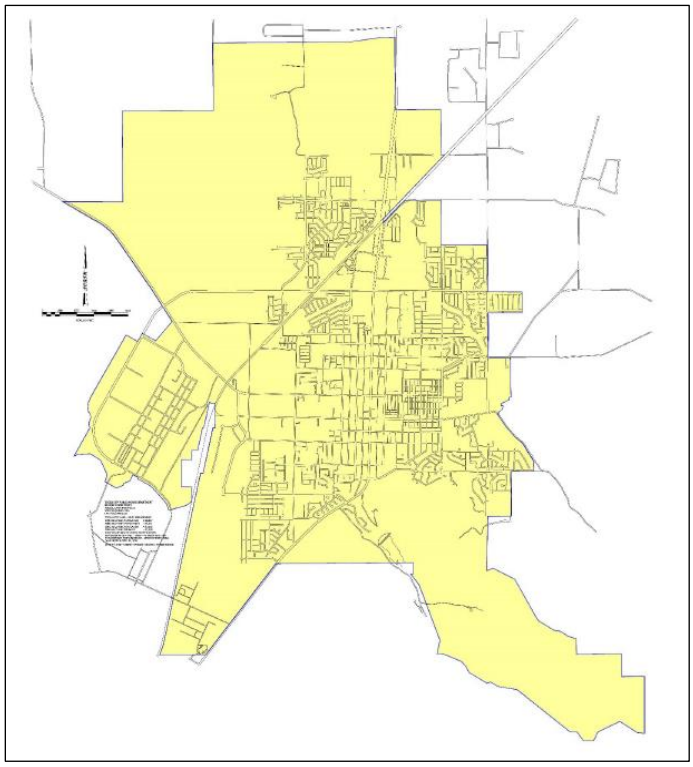
Service Area

The municipal boundaries of Tooele City encompass an area of just over 21 square miles. The city is located in the northeast portion of Tooele County and lies approximately 30 minutes southwest of Salt Lake City, as illustrated in the next figure.

FIGURE 2-4: Tooele City Regional Map

The next figure illustrates the municipal boundaries of the city, which also is the primary fire service area of the TCFD.[6]

FIGURE 2-5: City of Tooele and TCFD Primary Fire Service Area



6. Map Sources: Tooele City Adopted Budget Book-FY 2022.

SECTION 3. FIRE DEPARTMENT PROGRAMS AND SERVICES

FACILITIES

Fire facilities must be designed and constructed to accommodate both current and forecast trends in fire service vehicle type and manufactured dimensions. A facility must have sufficiently-sized bay doors, circulation space between garaged vehicles, departure and return aprons of adequate length and turn geometry to ensure safe response, and floor drains and oil separators to satisfy environmental concerns. Station vehicle bay areas should also consider future tactical vehicles that may need to be added to the fleet to address forecast response challenges, even if this consideration merely incorporates civil design that ensures adequate parcel space for additional bays to be constructed in the future.

Personnel-oriented needs in fire facilities must enable performance of daily duties in support of response operations. For personnel, fire facilities must have provisions for vehicle maintenance and repair; storage areas for essential equipment and supplies; space and amenities for administrative work, training, physical fitness, laundering, meal preparation, and personal hygiene/comfort; and—where a fire department is committed to minimize "turnout time"—bunking facilities.

A fire department facility may serve as a de facto "safe haven" during local community emergencies, and serve as likely command center for large-scale, protracted, campaign emergency incidents. Therefore, design details and construction materials and methods should embrace a goal of having a facility that can perform in an uninterrupted manner despite prevailing climatic conditions and/or disruption of utilities. Programmatic details, such as the provision of an emergency generator connected to automatic transfer switching—even going as far as to provide tertiary redundancy of power supply via a "piggyback" roll-up generator with manual transfer (should the primary generator fail)—provide effective safeguards that permit the fire department to function fully during local emergencies when response activity predictably peaks.

Personnel/occupant safety is a key element of effective station design. This begins with small details such as the quality of finish on bay floors and nonslip treads on stairwell steps to decrease tripping/fall hazards, or use of hands-free plumbing fixtures and easily disinfected surfaces/countertops to promote infection control. It continues with installation of specialized equipment such as an exhaust recovery system to capture and remove cancer-causing by-products of diesel fuel exhaust emissions. A design should thoughtfully incorporate best practices for achieving a safe and hygienic work environment.

An ergonomic layout and corresponding space adjacencies in a fire station should seek to limit the travel distances between occupied crew areas to the apparatus bays. Likewise, facility design should carefully consider complementary adjacencies, such as lavatories/showers in proximity of bunk rooms, desired segregations, and break rooms or fitness areas that are remote from sleeping quarters. Furnishings, fixtures, and equipment selections should be thoughtfully considered in view of the around-the-clock occupancy of fire facilities. Durability is essential, given the accelerated wear and life cycle of systems and goods in facilities that are constantly occupied and operational.

Sound community fire-rescue protection requires the strategic distribution of fire station facilities to ensure that effective service area coverage is achieved, that predicted response travel times satisfy prevailing community goals and national best practices, and that the facilities are capable of supporting mission-critical personnel and vehicle-oriented requirements and needs. Additionally, depending on a fire-rescue department's scope of services, size, and complexity, other facilities may be necessary to support emergency communications, personnel training, fleet and essential equipment maintenance and repair, and supply storage and distribution.

National standards such as NFPA 1500, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, outlines standards that transfer to facilities such as infection control, personnel and equipment decontamination, cancer prevention, storage of protective clothing, and employee fitness. NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Firefighting and Proximity Fire Fighting*, further delineates laundering standards for protective clothing and station wear. Laundry areas in fire facilities continue to evolve and are being separated from living areas to reduce contamination. Factors such as wastewater removal and air flow also need to be considered in a facility design.

The TCFD operates out of two facilities located in the central area of the city, and in near proximity to each other. Each station houses response apparatus from which crews assemble and respond 365 days a year. TCFD stations serve as operational centers for the department and locations for training and equipment maintenance. These stations also serve the community when needed, and certain administrative functions occur out of each. Station 1 serves as the main administrative facility for the department.

Station 1 (see following figure) is the oldest of the two facilities (constructed in 1957) and consists of just under 7,200 square feet (3,595 square-foot footprint) and three apparatus bays. In July 2000, the city commissioned a remodel and seismic evaluation cost study to determine the feasibility of renovating the current Station 1 due to age, space, and infrastructure issues, or constructing a new facility on the existing site. This led to an additional study in April 2021 that identified costs for a phased approach to constructing a new facility in the northern area of the city.

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FIGURE 3-1: TCFD Station 1

Station 2 (see next figure) was constructed in 1997 and consists of 4,440 square feet; it has 2.5 apparatus bays (approximately 2,750 square feet) and assorted workspaces.

FIGURE 3-2: TCFD Station 2

One solution to the concerns about Station 1 (age, ability to fit ladder apparatus, ability to expand/remodel) is to construct a new Station 3 in the northern area of the city. It has been

proposed that a new Station 3 be constructed in phases as outlined in the following table. Funding for this capital project is as follows: FY 21-22, $300,000; FY 22-23, $2,300,000.

TABLE 3-1: Proposed Phased Construction Approach to New Station 3

Phase I **Immediate Needs**	■ Fire Bays (storage of apparatus). ■ Turnout Room (personal protective gear storage). ■ Laundry Room and Decontamination Room. ■ Equipment Rooms. ■ Restrooms and Custodial Closet. ■ Mechanical Room and Electrical Room. ■ Site design (to include parking (10 stalls), generator, apparatus apron).
Phase II **Near-Future Needs**	■ Chief's Office and Office Space. ■ Entry/Vestibule. ■ Kitchen and Dayroom. ■ Training Room. ■ Additional Parking (30 stalls).
Phase III **Longer Term Needs**	■ Bunk Rooms with shower/restroom facilities. ■ Exercise Room. ■ Parking (4 additional stalls). ■ Air-Med Facility (1,300 square-foot facility with 24/7 living areas).

The next figure illustrates the proposed floor plan through Phase III of the fire station project (does not include the Air-Med facility).

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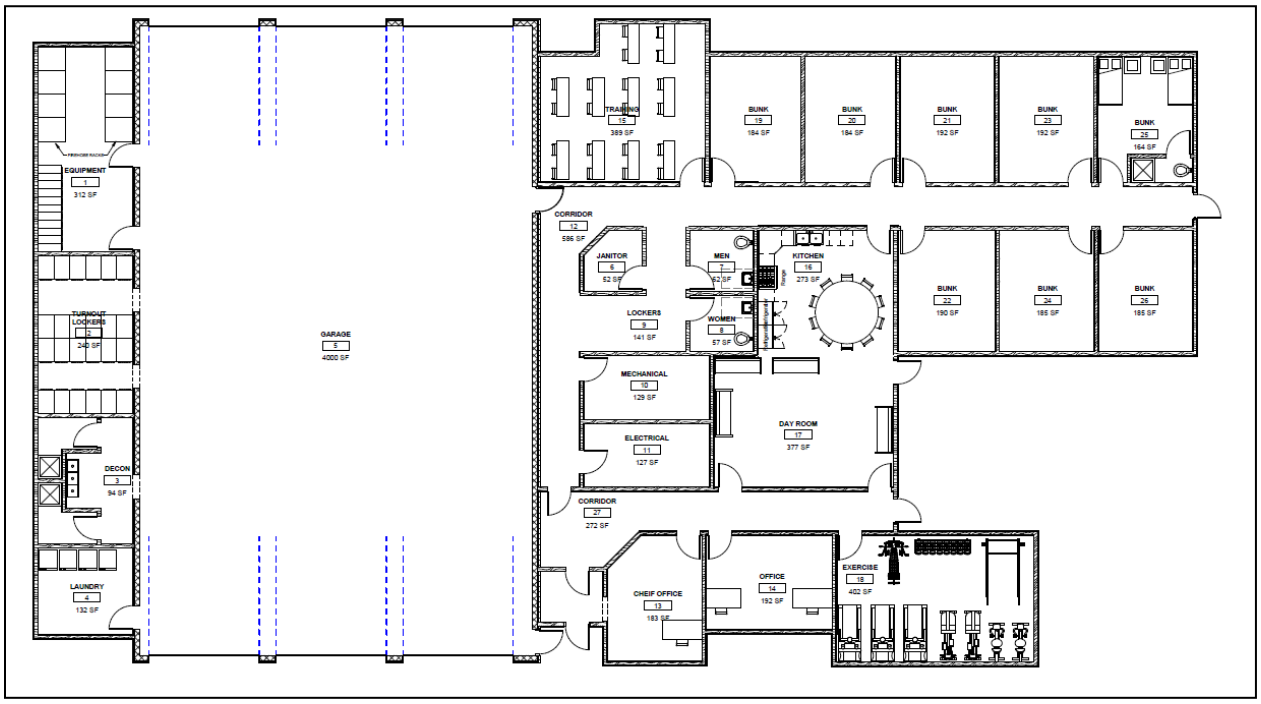
FIGURE 3-3: Proposed Fire Station 3 Floor Plan (Through Phase III)



The following table shows assigned apparatus to each of the current stations.

TABLE 3-2: TCFD Station Apparatus Assignments

Station 1	Station 2
Engine 9 - 209	Ladder 22 - 222
Engine 14 - 214	Ladder 24 - 224
Engine 20 - 220	Brush Truck 15 - 215
Engine 21 - 221	Brush Truck 16 - 216
Brush Truck 17 - 217	Brush Truck 23 - 223
Brush Truck 19 - 219	

Figure 3-4 on the next page illustrates the locations of the two existing stations, and the location of a proposed Station 3.

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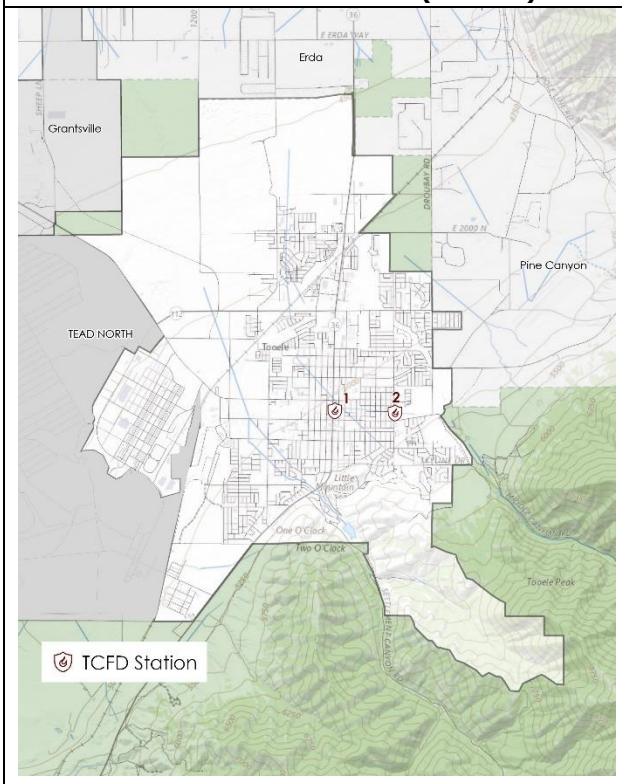
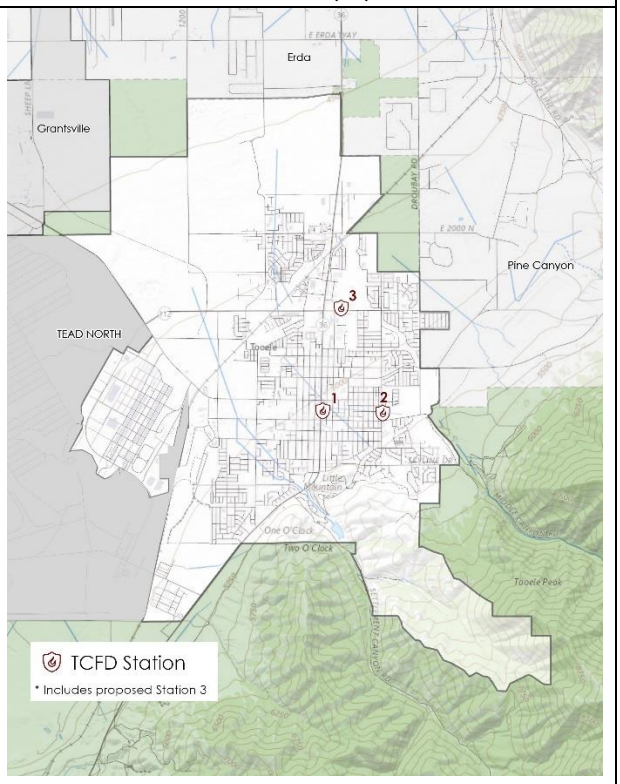
FIGURE 3-4: Current Station Locations and Proposed Station 3

Current Station Locations (1 and 2)	Stations 1, 2, 3
	

The TCFD would like to maintain Station 1 at its current location and renovate this facility, or construct a new facility in the proximity of the current Station 1 after the new Station 3 is completed. This plan would create a three-station alignment in the city; emergency apparatus would respond out of all three stations. *CPSM does not recommend remodeling Station 1 in a three-station deployment model in the long term. Rather, as a long-term planning objective, the department and city should look at relocating this station to the south and west when future funding becomes available. See further discussion below.*

CPSM reviewed the locations of the current stations, as well as the addition of Station 3. As already stated, sound community fire-rescue protection requires the strategic distribution of fire station facilities to ensure that effective service area coverage is achieved, that predicted response travel times satisfy prevailing community goals and national best practices, and that the facilities can support mission-critical personnel and vehicle-oriented requirements and needs now and into the future.

Maintaining Station 1 in the current location is not strategic in terms of distance between existing fire facilities and providing improved coverage. Improved coverage should be the goal of new station construction and/or remodeling of a current facility. Under the current plan for Station 3, the distances between existing facilities and the proposed location for Station 3 are as follows:

- Station 1 and Station 2: 0.9 miles
- Station 1 and Station 3: 1.5 miles
- Station 2 and Station 3: 1.9 miles

An additional benchmark is the ISO Public Protection Classification rating system. Under this system, one element a jurisdiction is graded on is the distribution within built-upon areas of engine companies and ladder companies (deployment analysis). For full credit in the Fire Suppression Rating Schedule (FSRS), a jurisdiction's fire protection area with residential and commercial properties should have a first-due engine company within 1.5 road miles and a ladder service company within 2.5 road miles.[7]

As engine and ladder companies both respond from fire facilities, and because engine companies are the more prevalent fire suppression company, fire facilities are predictably sited based on the response needs of engine companies. Given this, the following figures illustrate the current 1.5-mile deployment of each fire station (utilizing a 1.5-mile parallelogram or diamond shape, where all sides are equal), and then recommendations to achieve a more strategic fire facility siting plan.

The next figure illustrates the current station configuration with 1.5-mile coverage diamonds and the TCFD proposed three-station alignment with the new Station 3. When reviewing the figure, keep in mind that it may not be possible, because of the way municipal boundaries have been drawn and redrawn, to cover the entire built-upon area utilizing the 1.5 mile diamond coverage method.

Because the current station locations are centralized in one area of the city (central and south central built-upon areas), coverage for other parts of the city is lacking under the 1.5-mile coverage diamond modeling. This points to the need for a new facility and/or relocation of fire facilities. The addition of Station 3 expands the 1.5-mile ISO benchmark to the north and northeast, which provides considerable improvement in coverage in these areas.

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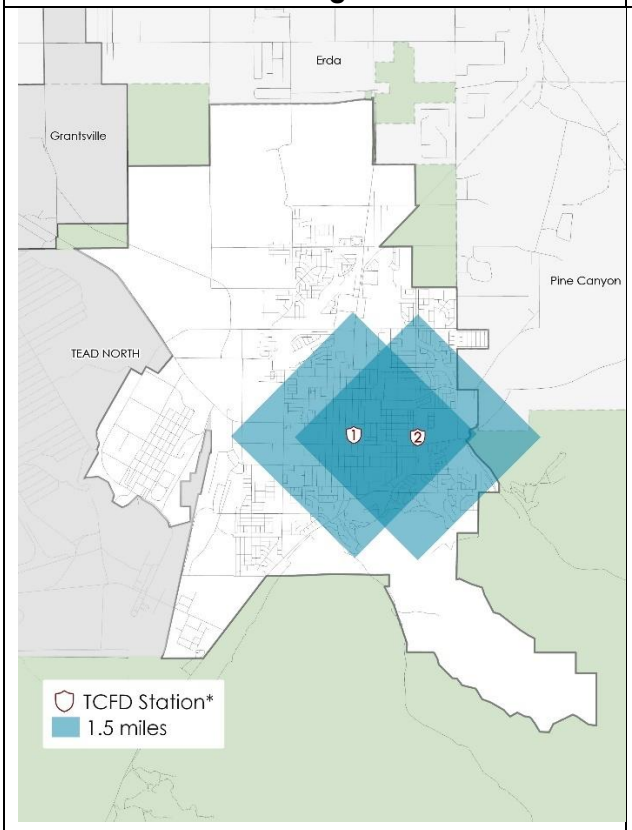
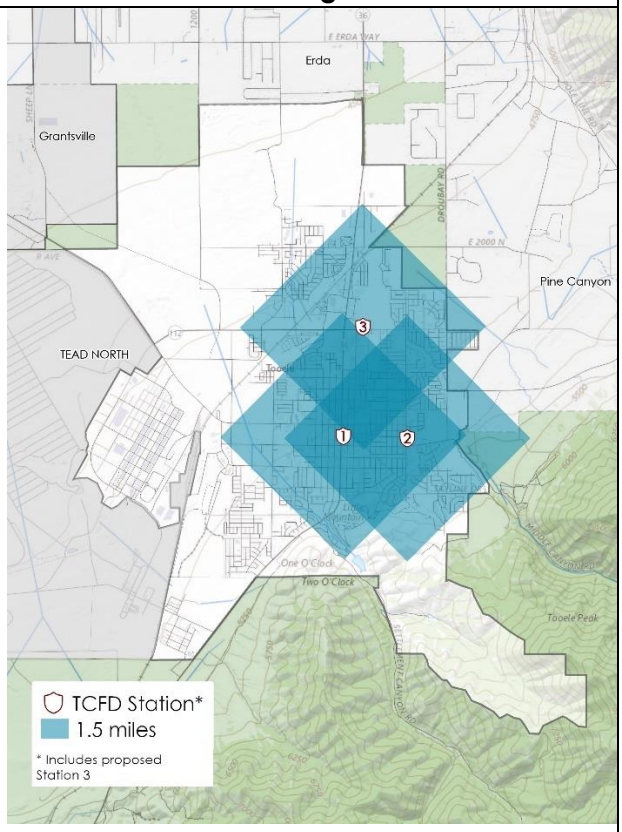
7. Insurance Services Office, ISO Mitigation, Deployment Analysis.

FIGURE 3-5: 1.5-Mile Coverage Diamonds: Current Station Locations Plus Station 3 Addition

Current Stations (1 and 2) 1.5 Mile Coverage Diamonds	Stations 1, 2, 3 1.5 Mile Coverage Diamonds
	

The next figure illustrates how the 1.5-mile coverage diamonds cover the city if Stations 2 and 3 become the primary fire facilities (a two-station model). The second part of the figure illustrates how three fire facilities would align with a new Station 3 and Station 1 relocated to the south and west of its current location.

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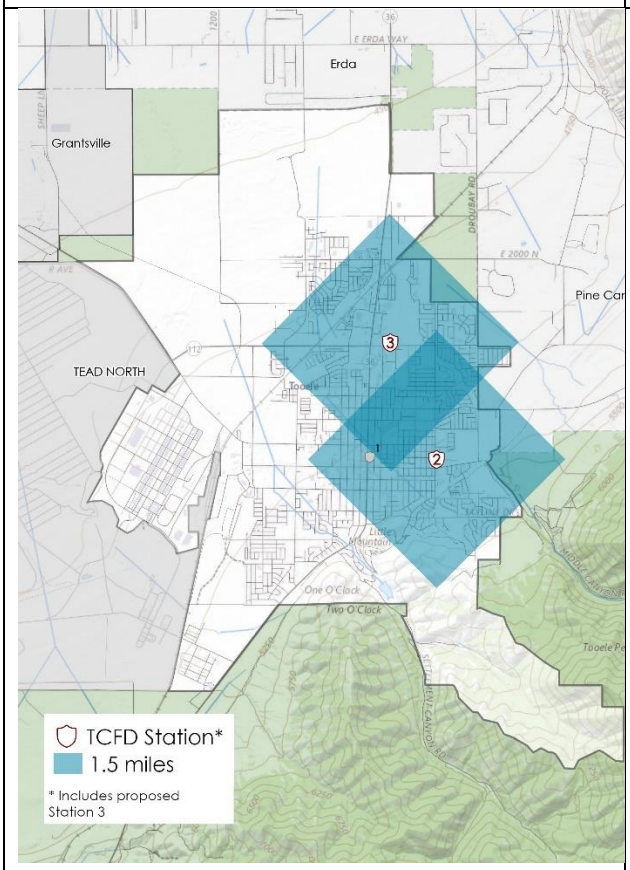
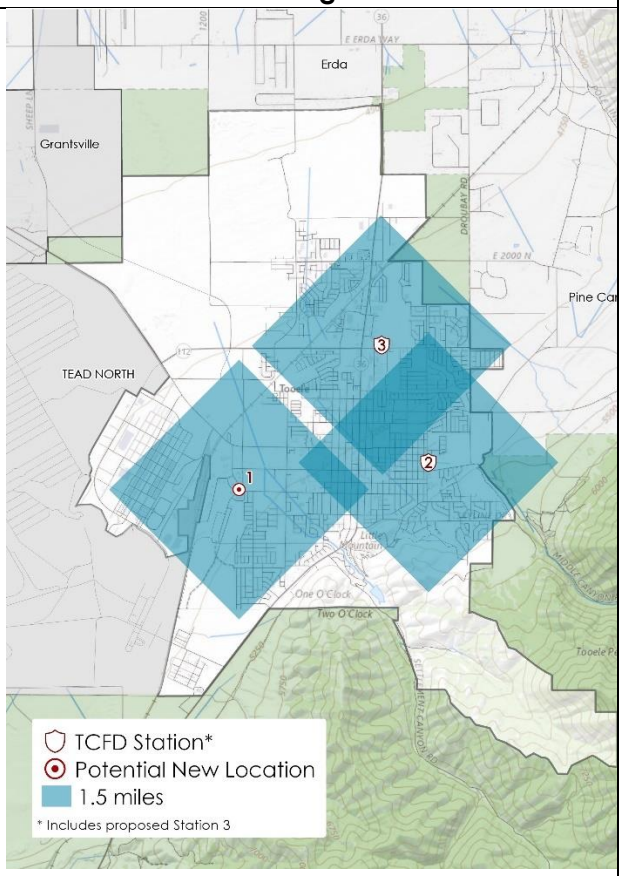
FIGURE 3-6: 1.5-Mile Coverage Diamonds: Stations 2 and 3 Only; Stations 2 and 3 with Station 1 Relocated

Stations 2 and 3 1.5 Mile Coverage Diamonds	Stations 2 and 3 Station 1 Relocated 1.5 Mile Coverage Diamonds
	

The above figure shows that a two-station model with Stations 2 and 3 provides coverage to the north and south central and eastern portions of the city. The 1.5-mile station coverage would still not exist for the southwest and western built-upon areas. However, moving Station 1 to a location south and west of its current location would provide considerable improvement in coverage. ***This is the optimal three-station alignment.***

Site selection for a relocated Station 1 fire facility, if the city chooses to move in this direction in the future, should consider the most strategic location that best serves the purpose of covering the built-upon areas in the currently uncovered areas. The city informed CPSM that city-owned land is available at the intersection of 1100 West and 200 South where a fire station could be sited. Based on the mapping analysis herein, CPSM does see the site at the intersection of 1100 West and 200 South as an effective and advantageous location for a fire station to close the gap on timely response and other metrics such as NFPA and ISO to south and west built-upon areas of the city. The next figure illustrates the two parcels on which the city could consider placing a fire station in the future.

FIGURE 3-7: Available Parcels: 1100 West and 200 South

Another consideration if the city does not favor a three-station alignment is a two-station alignment utilizing the new Station 3 location, remodeling Station 1, and closing station 2 as an emergency response location due to its proximity to Station 1. ***This achieves the best coverage utilizing the 1.5 mile diamonds for engine companies and 2.5 mile diamonds for ladder companies of a two-station fire department.*** Under this model, Station 2 can be repurposed as a primary training and shop facility, and for the storage of reserve equipment that otherwise cannot be stored at the primary stations.

It must be noted that any ladder apparatus placement at Station 1 likely will require modification to the building due to the length and height of this apparatus. Based on current ladder coverage and potential ladder coverage utilizing Station 1, CPSM recommends this should be explored if the city chooses a station model that includes the current Station 1. Modification would most likely involve an apparatus bay addition to the north side of the building without intrusion into the existing building (which could not be done due to current seismic-related construction restrictions).

The next figure illustrates centralized coverage of built-upon areas of the city at the 1.5-mile distance for engine companies and 2.5-mile distance for ladder companies using this two-station model.

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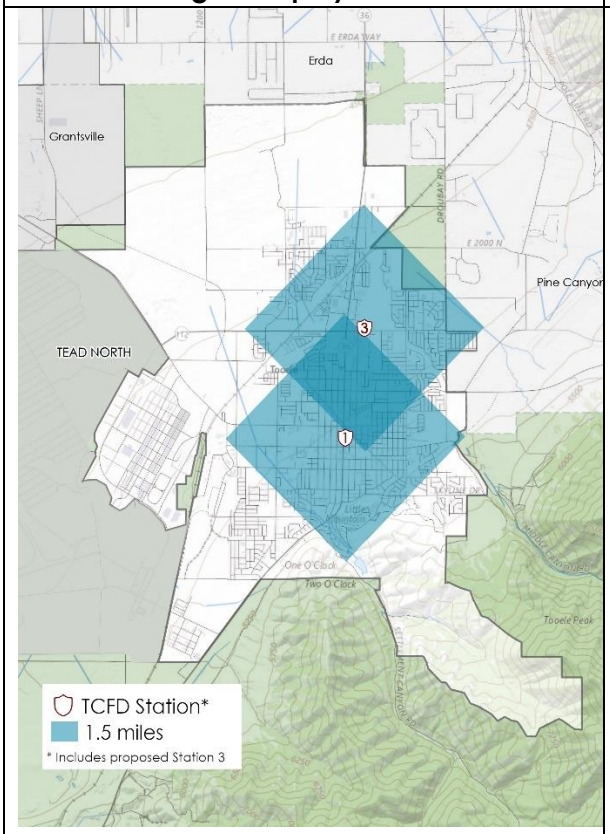
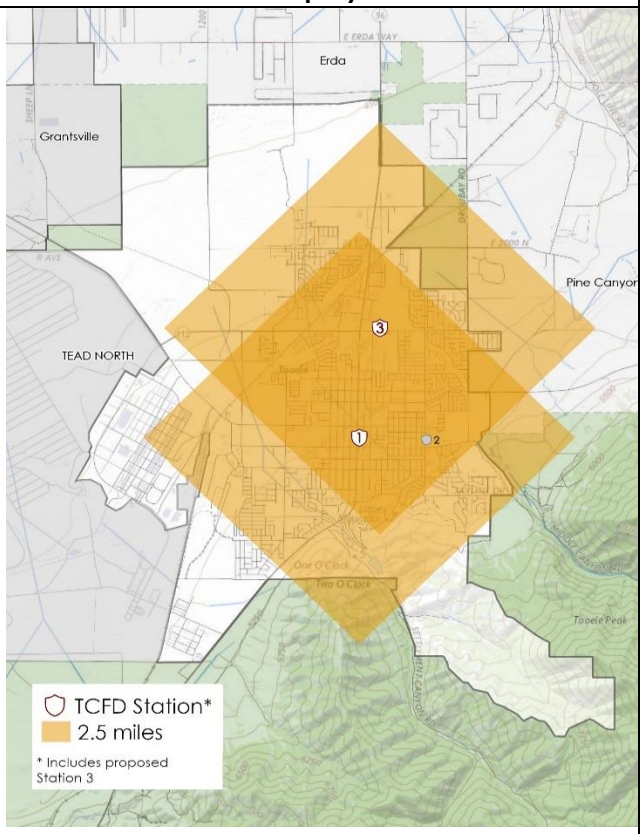
FIGURE 3-8: Coverage Diamonds: Stations 1 and 3 Configuration for Engines (1.5 Miles) and Ladders (2.5 Miles)

Stations 1 and 3 1.5 Mile Engine Deployment Diamonds	Stations 1 and 3 2.5 Mile Ladder Deployment Diamonds
	

Recommendations:

- CPSM recommends as a planning objective (over 1 to 3 years) that the city continue with its plan to construct a new Station 3.

CPSM further recommends the City review and consider the following fire facility alternatives to achieve optimal coverage in the city:

- The city construct Station 3 in its entirety and not in phases so that this station is fully functional when opened to meet current and future operational needs. CPSM recommends the TCFD deploy, at a minimum, a primary engine company and a primary ladder company out of Station 3, along with a primary engine company and a primary ladder company out of Station 2. In this scenario Station 1 is closed.
- The city should consider future fire facility planning and funding that relocates Station 1 south and west of its current location so as to provide deployment coverage to the south and west areas of the city. The city owns a parcel at the intersection of 1100 West and 200 South that will accommodate this facility. Once constructed and occupied, CPSM recommends the TCFD deploy at a minimum a primary engine company and a primary ladder company out of this location, a primary engine company out of Station 2, and a primary engine company and

a primary ladder company out of Station 3. This configuration and deployment would provide optimal coverage of engine and ladder companies in the city. ***CPSM views this as the most effective three-station model alternative.***

- In the short- to mid-term while considering a relocation of Station 1, and if the city desires to maintain a three station model, CPSM recommends the city maintain Station 1 without extensive remodeling so as to provide service to the west and southwest portions of the city. CPSM recommends the TCFD deploy at a minimum a primary engine company out of this location, a primary ladder company out of Station 2, and a primary engine company and a primary ladder company out of Station 3 as this configuration provides optimal coverage of engine and ladder companies in the city in the short- to mid-term as the city considers a relocation of Station 1.

- If the city chooses not to relocate Station 1 and maintain a two-station fire department, CPSM recommends the city construct Station 3 in its entirety, remodel Station 1, and close Station 2 as an operational deployment station due to its proximity to Station 1. **This will achieve the most strategic two-station fire facility operational response coverage.** CPSM recommends the TCFD then deploy a primary engine company and primary ladder company out of each of the two stations (1 and 3). Under this model, Station 1 will require, if conditions allow the construction of an apparatus bay (north side of structure) that will accommodate a ladder apparatus. Station 2 can be repurposed as a shop/training facility and fire department annex for the storage of training and reserve apparatus and equipment.

FLEET

The provision of an operationally ready and strategically located fleet of mission-essential fire-rescue vehicles is fundamental to the ability of a fire-rescue department to deliver reliable and efficient public safety within a community.

The procurement, maintenance, and eventual replacement of response vehicles is one of the largest expenses incurred in sustaining a community's fire-rescue department. While it is the personnel of the TCFD who provide emergency services within the community, the department's fleet of response vehicles is essential to operational success. Modern, reliable vehicles are needed to deliver responders and the equipment/materials they employ to the scene of dispatched emergencies within the city.

TCFD apparatus maintenance is performed by the city's vehicle maintenance shop and a private vendor that specializes in apparatus-specific maintenance and annual testing. City vehicle maintenance shop work includes oil change and light service work that does not involve the fire pump or aerial hydraulic system maintenance and repair. Apparatus-specific work, aerial ladder testing, and annual preventive maintenance and required service is performed by a private vendor who specializes in this type of fire apparatus work. This combination of maintenance and repair work is common practice across the country. The intricacies and scope of fire pumps and fire pump controls, aerial ladder hydraulic systems and controls, and apparatus electrical control systems (the main components outside of the motor, chassis, and drive train) are best left in the hands of specialists for diagnosis, maintenance, and repair.

To ensure vehicle readiness, the TCFD has three members in stipend positions. These members are responsible for performing weekly checks, small equipment engine repair and maintenance, and coordinating regular maintenance and repair with the city's vehicle maintenance shop or the private vendor for engine- or ladder-specific maintenance and repair.

The TCFD's fleet of operational response apparatus is shown in the following table.

TABLE 3-3: TCFD Fleet

Apparatus Type	Year In Service	Operational Assignment
Engine: Van Pelt	1972	Active-Frontline
Engine: Mack CF	1982	Active-Frontline
Engine: Mack CF	1978	Active-Reserve
Engine: Pierce Quantum	1997	Active-Frontline
Engine: Pierce Quantum	2002	Active-Frontline
Pierce Quantum Quint-65' Ladder	2002	Active-Frontline
Pierce Quantum Quint-105' Ladder	2016	Active-Frontline
F350: Brush Truck	1992	Active-Frontline
F-350: Brush Truck	1992	Active-Frontline
F-350: Brush Truck	1997	Active-Frontline
F-550: Brush Truck	2003	Active-Frontline
Chevrolet 3500: Brush Truck	2008	Active-Frontline
The TCFD also has an assortment of command and staff vehicles.	Various Years	Active-Frontline

Replacement of fire-rescue response vehicles is a necessary, albeit expensive, element of fire department budgeting that should reflect careful planning. A well-planned and documented emergency vehicle replacement plan ensures ongoing preservation of a safe, dependable, and operationally capable response fleet. A plan must also include a schedule for future capital outlay that is affordable to the community.

NFPA 1901, *Standard for Automotive Fire Apparatus*, serves as a guide to the manufacturers that build fire apparatus and the fire departments that purchase them. This document is updated every five to eight years (or shorter time periods) using input from the public and industry stakeholders through a formal review process. The committee membership is made up of representatives from the fire service, manufacturers, consultants, and special interest groups. The committee monitors various issues and problems that occur with fire apparatus and attempts to develop standards that address those issues. A primary interest of the committee over the past years has been improving firefighter safety and reducing fire apparatus crashes.

The Annex Material in NFPA 1901 (2016) contains recommendations and work sheets to assist in decision-making in vehicle purchasing. With respect to recommended vehicle service life, the following excerpt is noteworthy:

> *"It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, Standard for Fire Apparatus Refurbishing (2016), to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus."*

The impetus for these recommended service life thresholds is the continual industry advances in vehicle and occupant safety. Despite good stewardship and maintenance of emergency vehicles in sound operating condition, there are many advances in occupant and vehicle component safety, such as fully enclosed cabs, enhanced rollover protection and air bags,

three-point restraints, antilock brakes, increased visibility, cab noise abatement/hearing protection, a clean cab free from carbon products, and a host of other improvements as reflected in each revision of NFPA 1901. These improvements provide safer response vehicles for those providing emergency services within the community, as well those "sharing the road" with these responders.

Many departments use a 10-5 rule (10 years front-line service, then 5 years of reserve service) when programming replacement of fire apparatus such as engines, ladders, water tenders, heavy rescues, and heavy squad type haz-mat vehicles. Annex D of the current NFPA 1912 edition states:

> *To maximize fire fighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities. In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards or the equivalent Underwriters Laboratories of Canada (ULC) standards. Because the changes, upgrades, and fine tuning to NFPA 1901, Standard for Automotive Fire Apparatus have been truly significant, especially in the area of safety, fire departments should seriously consider the value (or risk) to fire fighters of keeping fire apparatus more than 15 years old in first-line service.*
>
> *It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status, be upgraded in accordance with NFPA 1912, and incorporate as many features as possible of the current fire apparatus standard. This will insure that, while the apparatus might not totally comply with the current editions of the automotive fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available for firefighters who use the apparatus.*

Under the NFPA1912 standard there are two types of refurbishments a fire department can choose. These are Level 1 and Level 2 refurbishments. According to NFPA 1912, a Level 1 refurbishment includes *the assembly of a new fire apparatus by the use of a new chassis frame, driving and crew compartment, front axle, steering and suspension components, and the use of either new components or components from existing apparatus for the remainder of the of the apparatus.* A Level 2 refurbishment includes *the upgrade of major components or systems of a fire apparatus with components or systems of a fire apparatus that comply with the applicable standards in effect at the time the original apparatus was manufactured.*

A few important points to note regarding the NFPA 1912 standard regarding the refurbishment of heavy fire apparatus. These are:[8]

- Apparatus that was not manufactured to applicable NFPA fire apparatus standards or that is 25 years old should be replaced.
- A vehicle that undergoes a Level 1 refurbishing receives a new make and model designation and a new Certificate of Origin for the current calendar year. Apparatus receiving a Level 1 refurbishing are intended to meet the current edition of the NFPA automotive fire apparatus standard. *This is the optimal level of refurbishing*.

8. NFPA 1912 Standard for Fire Apparatus Refurbishing, 2016 Edition.

- A vehicle that has undergone a Level 2 refurbishing retains its original make and model identification as well as its original title and year of manufacture designation. Apparatus receiving Level 2 refurbishing are intended to meet the NFPA automotive fire apparatus standard in effect when the apparatus was manufactured.

The TCFD does not have an established fleet replacement plan that follows the NFPA recommendations for apparatus replacement as such: 10 years of front-line service then 5 years of reserve service, or 15 years of front-line service and then upgrading to the NFPA 1912 standard. The second option is reasonable considering the cost of new fire apparatus today. The TCFD operates an active status fleet of seven heavy fire apparatus (five engines and two ladders). Six of these apparatuses are beyond the 15-year front-line/reserve age for active status as recommended in the current edition of NFPA 1901. TCFD apparatus, particularly those that are older than 20 years, although seemingly road-and response-worthy, lack contemporary road, motor, chassis and chassis systems, and emergency response operational and safety features included in apparatus constructed during the last two to three cycles of NFPA 1901 (2003, 2009, 2016), as noted above.

One way to reduce the replacement costs of heavy apparatus is to consider the refurbishment process. Refurbishing engine and ladder apparatus typically costs half of what a new apparatus costs, depending of course on the type of apparatus (engine or ladder) and the components (motor, drive train, chassis, pump, paint, steering etc.) that must be refurbished.

Recommendations:

- CPSM recommends the TCFD and the city develop, over a one-year period, a fire apparatus replacement plan that follows apparatus age recommendations in accordance with NFPA 1901 standard, *Standard for Automotive Fire Apparatus*.

Planning objectives should include, to the extent possible and based on funding:

- First-line apparatus should not exceed 15 years of service on the front line. Once an apparatus reaches this age, it should undergo a Level 1 refurbishing in accordance with NFPA 1912, *Standard for Fire Apparatus Refurbishing* (current standard) as a first alternative, or replacement if maintenance records and wear and tear warrant replacement.
- Apparatus in active/reserve status which is between 20 and 25 years old should comply with NFPA 1901 and undergo a Level 1 refurbishing in accordance with NFPA 1912 as an immediate planning objective if the department plans to continue to use this apparatus. All apparatus at the 25-year-old mark should be considered for replacement. Apparatus greater than 25 years old should be removed from service.
- Apparatus components which are either fixed or portable and which require annual testing—fire pumps, aerial ladder and aerial ladder assemblies, ground ladders, self-contained breathing apparatus to include personnel fit-testing, and fire hose—should be tested in accordance with manufacturer and industry specifications and standards, and proper records maintained at the department and city and with the vendor.
- Based on the current age and condition of the TCFD fleet, CPSM proposes a fleet replacement plan as shown in the following table. This plan includes recommendations to remove two engine apparatus from service due to age, to replace one engine apparatus in the immediate future due to its age, to replace another engine in the next 12 to 24 months, and to refurbish one engine and one ladder over a 24 to 48 month period to gain more years

of service for these two vehicles if mechanically sound and the bodies remain in good condition.

This fleet replacement/refurbishment plan is aggressive but is necessary. As things stand today, four of the department's heavy fire apparatus have aged out of the recommended years of service life.

TABLE 3-4: Fleet Replacement and Refurbishment Recommendations

Apparatus Type	Year In Service	Recommended Action
Engine: Van Pelt	1972	**Remove from front-line service**. This apparatus is well beyond the NFPA 1901 recommended life span.
Engine: Mack CF	1982	**Remove from front-line service.** This apparatus is well beyond the NFPA 1901 recommended life span. **Replace as soon as practical, but no later than in the next fiscal year**, with a comparable new engine that meets NFPA 1901 standards.
Engine: Mack CF	1978	**Remove from front-line service.** This apparatus is well beyond the NFPA 1901 recommended life span.
Engine: Pierce Quantum	1997	**Replace in the next 12-24 months**. This apparatus is at the terminal age (25 years) for heavy fire apparatus life span.
Engine: Pierce Quantum	2002	**Level 1Refurbish in the next 24 to 36 months** in accordance with NFPA 1912 standards. If not mechanically feasible, replace.
Pierce Quantum Quint 65-foot Ladder	2002	**Level 1 Refurbish in the next 36 to 48 months** in accordance with NFPA 1912 standards. If not mechanically feasible, replace.
Pierce Quantum Quint 105-foot Ladder	2016	**Plan for a Level 1 Refurbish in 2031.** If not mechanically feasible, replace.

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TRAINING PROGRAMS

Training is, without question, one of the most essential functions that a fire department should be performing on a regular basis. One could even make a credible argument that training is, in some ways, more important than emergency responses because a department that is not well trained, prepared, and operationally ready will be unable to fulfill its emergency response obligations and mission. Education and training are vital at all levels of fire service operations to ensure that are necessary functions are completed correctly, safely, and effectively. A comprehensive, diverse, and ongoing training program is critical to the fire department's level of success.

An effective fire department training program must cover all the essential elements of that department's core missions and responsibilities. The level of training or education required given a set of tasks varies with the jobs to be performed. The program must include an appropriate combination of technical/didactic training, manipulative or hands-on/practical evolutions, and training assessment to gauge the effectiveness of these efforts. Most of the training, but particularly the practical, standardized, hands-on training evolutions should be developed based upon the department's own operating procedures and operations while remaining cognizant of widely accepted practices and standards that could be used as a benchmark to judge the department's operations for any number of reasons.

Certain Occupational Safety and Health Administration (OSHA)[9] regulations dictate that minimum training must be completed on an annual basis. This training covers assorted topics that include:

- A review of the respiratory protection standard, self-contained breathing apparatus (SCBA) refresher and user competency training, SCBA fit testing (29 CFR 1910.134).
- Hazardous Materials Training (29 CFR 1910.120).
- Confined Space Training (29 CFR 1910.146).
- Structural Firefighting Training (29 CFR 1910.156).

Because so much depends upon the ability of the emergency responder to effectively deal with an emergency, education and training must have a prominent position within an emergency responder's schedule of activities. Education and training programs also help to create the character of a fire service organization. Agencies that place a real emphasis on their training tend to be more proficient in carrying out emergency incident duties. The prioritization of training also fosters an image of professionalism and instills pride in the organization.

The TCFD has certified instructors available to manage and provide training and education to the members of the department. New member and incumbent training are developed and implemented at the officer and instructor levels. Fire certification levels in accordance with the NFPA and National Wildfire Coordinating Group (NWCG) offered in the State of Utah and applicable to the TCFD includes:

- Hazardous Materials (HM)Awareness, Operations and Technician.
- Firefighter (FF) I and II.
- Apparatus Driver Operator (ADO-P or ADO-A): Pumper and Aerial.

9. The Utah Occupational Safety and Health Division (Utah Plan) covers state and local government employees.

- Fire Officer (OFF) I-IV.
- Fire Instructor (INST) I, II, III.
- Fire Inspector I, II, III.
- Fire Investigator.
- Wildland Firefighter (WLFF) I and II.
- Technical Rescue: Rope Rescue, Ice Rescue, Trench Rescue, Collapse Rescue, Vehicle Rescue, Machinery Rescue.

Firefighter certification at the local member level is governed by Utah Fire Service Certification System (UFSCS) and administered by the Utah Fire and Rescue Academy (UFRA). Training that is required to be eligible for certification can be received in several ways as described below:[10]

- **Direct Delivery** – Courses include all necessary manuals (loaners), handouts, quizzes, and related classroom materials. These courses also include a completed course syllabus with UFRA instructors assigned and the scheduling of necessary props. Direct delivery classes must be scheduled through the department's assigned UFRA Program Manager.
- **Supported Delivery** – Courses may include student manuals (if available) and a copy of the current UFRA curriculum for the subject requested. It is the responsibility of the department to supply/schedule instructors and supply all relevant student materials. It is also the responsibility of the department to schedule certification testing if such testing is desired.

The TCFD offers training for certification testing at the supported delivery method at TCFD facilities. Members can of course also attend direct delivery classes as well at state-supported sites.

In 2021, the TCFD had a calendar year incumbent monthly training program (on the first and third Wednesdays of the month) that included fire suppression operations and extinguishment, technical rescue that includes confined space training and rappelling, vehicle fire operations and extinguishment, wildland firefighting, aerial truck operations, self-contained breathing apparatus, radio communications, and medical training. TCFD requires that each "First Class Firefighter" attend 75 percent of the scheduled training events as outlined above. Scheduled monthly training is generally conducted in two-hour segments, which equates to 48 hours of in-house training in a calendar year. Additional training that is voluntary is conducted on Saturdays in four- to eight-hour segments.

There are no official department guidelines requiring that combat firefighters receive specific training and certifications. There are also no official department guidelines requiring that officers receive specific training and certifications. Article III, Section 4 of the TVFD bylaws has a requirement for training for new members. This requirement is as follows:

Section 4 – Probationary Period

> *(1) Each new member of this Department shall have a probationary period. Upon admittance to the department the proposed member shall have a six-month probationary period to be trained on department guidelines and tactics. Each firefighter shall also have two years to become Firefighter 1 certified. Certification will be determined by the standards required by the Department. Training*

10. Utah Fire and Rescue Academy, Utah Fire and Rescue Academy Training Page | Utah Fire and Rescue Academy | Utah Valley University (uvu.edu)

opportunities must be provided by the Chief Officers and Training committee. If requirements are not met within the probationary period, an extension may be requested by the member and a vote shall be taken by the Department for an extension of time.

When reviewed in December 2021, it was found that some TCFD members had at a minimum these state certifications: FF1, Haz-Mat Awareness, and WLF1. Some have FF2, INST1 or 2, HM Ops, ADO-P, OFF 1 or 2. Some active members do not have necessary certifications. Several department-wide weaknesses in training were identified in December 2021. These included a finding that not all officers had obtained any Fire Officer certifications; TCFD fire inspectors including the Fire Marshal had not obtained the fire inspector and fire investigation certifications; and several members, including those in key positions, had no certifications.

Much work must be done to ensure TCFD combat firefighters and officers achieve and maintain the basic-level firefighting and officer certifications. This is critical to ensure the safety of each TCFD member and the citizens of the city. Operating in Immediately Dangerous to Life and Health (IDLH) environments with zero visibility, or on the perimeter of a fast-moving wild land-urban interface fire requires formal classroom training that teaches the behavior of fire and the fundamental aspects of an IDLH environment. When followed up with initial and continuous hands-on practical application through certification courses, this breadth of training ensures a firefighter and fire officer has acquired the fundamentals of the profession, from which it becomes his/her responsibility to continuously learn and master.

Recommendations:

- CPSM recommends the TCFD Fire Chief work with the city Human Resources Director and draft and implement, over an immediate six-month period, a formal Standard Operating Guidelines for training that include:
  - Standard state fire certifications for combat firefighters to include: Haz-Mat Awareness, Haz-Mat Operations, Firefighter I, Firefighter II, Wildland Firefighter I, and Emergency Vehicle Operator Course to include operating brush vehicle apparatus.
  - Standard state fire certifications for members who drive and operate the heavy fire apparatus to include: All certifications for combat firefighter plus Apparatus Driver Operator-Pumper (for those who drive the engine apparatus) and Apparatus Driver Operator-Aerial (for those who drive the ladder apparatus).
  - Standard state fire certifications for first-line officers (Lieutenants and Captains) to include: All certifications for combat firefighter plus Fire Officer I certification and Wild Land Firefighter II certification.
  - Standard state fire certifications for Chief Officers (Fire Chief, Assistant Chiefs) to include: All certifications for combat firefighter and first-line officers plus Fire Officer II at a minimum.
  - Standard state fire certifications for Training Officers to include: All certifications for combat firefighter plus Fire Instructor I at a minimum. It is further recommended the lead Training Officer have Fire Instructor II certification at a minimum.
  - Standard state fire certifications for Fire Inspectors and Fire Investigators to include: All certifications for combat firefighter plus Fire Inspector I at a minimum for Fire Inspectors, and Fire Investigator I for Fire Investigators. It is further recommended the lead Fire Inspector or person designated as the Fire Marshal have Fire Inspector II and Fire Investigator I certification at a minimum.

- The Training Standard Operating Guidelines should also address the standard state certifications for members who take the lead in technical rescue components such as Rope Rescue, Ice Rescue, Trench Rescue, Collapse Rescue, Vehicle Rescue, and Machinery Rescue.

- The Training Standard Operating Guidelines should outline aggressive implementation goals and dates for each section of these recommendations, making combat firefighter, fire inspector, and fire officer (in this order) certification training the priority over the next 18 to 24 month period. The Guidelines should also contemplate how to manage members in all positions who do not meet the training certifications, to include any stipend they may be receiving, and how these Guidelines link to the recruitment and retention of current and future members.

COMMUNITY RISK REDUCTION PROGRAMS

Community risk reduction activities are important undertakings of a contemporary fire department. A comprehensive fire protection system in every jurisdiction should include, at a minimum, the key functions of fire prevention, code enforcement, inspections, and public education. Preventing fires before they occur, and limiting the impact of those that do, should be priority objectives of every fire department. Fire investigation is a mission-important function of fire departments, as this function serves to determine how a fire started and why the fire behaved the way it did, providing information that plays a significant role in fire prevention efforts. Educating the public about fire safety and teaching residents appropriate behaviors on how to react should they be confronted with a fire is also an important life safety responsibility of the fire department.

Fire suppression and response, although necessary to protect property, have negligible impact on preventing fires. Rather, it is public fire education, fire prevention, and built-in fire protection systems that are essential elements in protecting citizens from death and injury due to fire, smoke inhalation, and carbon monoxide poisoning. The fire prevention mission is of utmost importance, as it is the only area of service delivery that dedicates 100 percent of its effort to the reduction of the incidence of fire.

Fire prevention is a key responsibility of every member of the fire department, and fire prevention activities should include all personnel. Personnel can be assigned with the responsibility for "in-service" inspections to identify and mitigate fire hazards in buildings, to familiarize firefighters with the layout of buildings, identify risks they may encounter during firefighting operations, and to develop pre-fire plans. On-duty personnel in many departments are also assigned responsibility for permit inspections and public fire safety education activities.

Fire prevention should be approached in a truly systematic manner, and many community stakeholders have a personal stake and/or responsibility in these endeavors. A significant percent of all the requirements found in building/construction and related codes are related in some way to fire protection and safety. Various activities such as plan reviews, permits, and inspections are often spread among different departments in the municipal government and are often not coordinated nearly as effectively as they should be. Every effort should be made to ensure these activities are managed effectively between departments.

The fire prevention function in the city is managed by the Bureau of Fire Prevention in the TCFD in coordination with the city's Community Development Department. Part-time fire inspectors conduct fire inspections.

At the time of this analysis the City of Tooele and TCFD were utilizing the following fire and building codes:

- The International Fire Code, 2018 edition.
- The International Building Code, 2018 edition.

The city also utilized the following building related codes:

- The International Residential Code, 2015 Edition
  - Appendix Q of the 2018 edition of the International Residential Code, issued by the International Code Council.
- International Fuel Gas Code, 2018 Edition.
- International Energy Conservation Code
  - 2015 edition for residential.
  - 2018 edition for commercial.
- The International Existing Building Code, 2018 Edition.
  - Subject to additions in the Utah State Code [Title 15A-2-103(1, k-o)]).
- International Mechanical Code, 2018 Edition.
- National Electric Code, 2020 Edition.
- International Plumbing Code, 2018 Edition.
- Utah Wildland Urban Interface Code, issued by the International Code Council, 2006 Edition.
  - Consistent with Title 65A, Chapter 8, Management of Forest Lands and Fire Control.
  - Includes alternatives or amendments approved by the Utah Division of Forestry, as a construction code that may be adopted by a local compliance agency by local ordinance or other similar action as a local amendment to the codes listed in this section.[11]

There are many reasons why existing buildings should be inspected for fire code compliance. The obvious purpose is to ensure that occupants of the building are living, working, or occupying a building that is safe for them to do so. Some buildings are required to have specific inspections conducted based on the type of occupancy and the use of the buildings such as but not limited to healthcare facilities (hospitals, nursing homes, etc.), schools, restaurants, and places of assembly. These inspections are mandated by various statutes, ordinances, and codes.

Fire inspections can also identify violations and make follow-up inspections to ensure that violations are addressed and that the fire code is enforced. In fire prevention, the term "enforcement" is most often associated with inspectors performing walk-throughs of entire facilities, looking for any hazards or violations of applicable codes. Educating the owner to the requirements as well as the spirit and intent of the code can also attain positive benefits for fire and life safety. Of course, this also improves community and business relationships.

In Utah, there is no legislated requirement for fire inspections. In a conversation with the state's Assistant Fire Marshal, we found the state recommends all businesses/occupancies be inspected

11. Utah Code Section 15A-2-103

on an annual basis for the reasons stated herein, and for the safety of occupants and responding firefighters.

New businesses in the city are required to have a business license. These occupancies require an initial fire inspection. Other occupancies in the city are mandated through licensing to have an annual fire inspection. In Utah these include occupancies that care for vulnerable populations such as hospitals, assisted living facilities, daycare, and the like. Places of public assembly, occupancies with cooking and range hood systems, and those buildings with fire protection systems (sprinkler, standpipe, automatic alarms) in the city should be routinely inspected to ensure these public safety protection systems are maintained per the fire code and are operable. Lastly, the Chapter 5-1-8(2) of the City Code states:

> *Existing places of business licensed within the City may be inspected periodically by departments of the City, annually upon the City's own initiative or upon the City receiving a complaint of alleged noncompliance, for compliance with building, fire, health, and other City codes, ordinances, and regulations.*

The City of Tooele has almost 800 occupancies that require a fire inspection if not annually, at least on a consistent bi-annual or tri-annual basis based on life-safety, process, storage, fire, or building hazard. During the analysis, CPSM identified several weaknesses in the fire prevention function of the TCFD. These include:

- TCFD Fire Inspectors are not currently state certified at the Fire Inspector I or higher state certification, nor does the TCFD have a requirement that Fire Inspectors must be certified to perform these duties.
  - In January 2022, the Mayor hired three current firefighters who have the Fire Inspector certification to conduct fire inspections in the city.
- The TCFD does not have a fire inspection plan for all occupancy types that outlines what occupancies are inspected and when. The TCFD relies on notification from the city when a business license is issued (this requires a fire inspection), or when certain occupancies that require licensing or permitting contact the TCFD for an inspection.

The TCFD has a public fire education program, which is a vital component of an overall Community Risk Reduction program, particularly in the residential areas of the city. This effort is very commendable and results in time and resources well spent. A significant percentage of all fires, fire deaths, and injuries occur in the home, an area where code enforcement and inspection programs have little to no jurisdiction. Public education is the area where the fire service will make the greatest impact on preventing fires and subsequently reducing the accompanying loss of life, injuries, and property damage through adjusting people's attitudes and behaviors regarding fires and fire safety.

The investigation of the cause and origin of fires is also an important part of a comprehensive fire prevention system. Determining the cause of fires can help with future prevention efforts. In Tooele, the Incident Commander or Chief Officer initiates the fire origin and cause determination process. When possible, they can make those determinations. When needed, particularly when the fire involves an explosion or explosive device, significant loss, injury, or fatality, a request for the State Fire Marshal to respond is made to perform an in-depth investigation.

The TCFD has completed the following Community Risk Reduction work in 2018, 2019, 2020, and 2021 as detailed in the following table.

TABLE 3-5: Community Risk Reduction Activity, 2018–2021

Year	Fire Inspections		Year	Fire Inspections	
	Occupancy Type	**Number**		**Occupancy Type**	**Number**
	Assembly Group A-2	4		Assembly Group A-2	6
	Assembly Group A-4	2		Assembly Group A-3	2
	Business Group B	44		Business Group B	30
	Educational Group E	3		Educational Group E	3
	Factory Group F-1	4		Factory Group F-1	4
2018	Factory Group F-2	1	**2019**	Factory Group F-2	2
	High Hazard Group H-2	1		High Hazard Group H	1
	Mercantile Group M	15		Institutional Group I	2
	Residential Group R-2	1		Mercantile Group M	15
	Storage Group S-1	6		Residential Group R-2	1
	Total	**81**		Storage Group S-1	7
				Total	**73**
	Occupancy Type	**Number**		**Occupancy Type**	**Number**
	Assembly Group A-2	4		Assembly Group A-2	5
	Business Group B	30		Assembly Group A-3	2
	Educational Group E	2		Business Group B	9
	Factory Group F	1		Educational Group E	5
2020	High Hazard Group H-3	2	**2021**	Factory Group F	6
	Mercantile Group M	14		Institutional Group I	1
	Storage Group S-1	5		Mercantile Group M	6
	Total	**58**		Residential Group R-2	1
				Total	**35**

Recommendations:

- Community Risk Reduction is a city-wide public safety effort that includes fire prevention inspections and fire code enforcement, public safety education, and investigation of fires. The fire inspection program has certain state- and city- legislated requirements. As the department's current fire prevention inspection and fire code enforcement functions do not have a plan to meet the city's growing fire inspection demand and are not consistently administered and managed as outlined in this analysis, CPSM recommends that the city hire a full-time Fire Marshal to lead and manage the Community Risk Reduction program. This program should include fire prevention inspections and fire code enforcement, the investigation of fires, and public fire education.
- In addition to formal education requirements deemed appropriate by the city's Human Resources Director commensurate with the position, the Fire Marshal candidate should have at minimum the following Utah Fire and Rescue Academy state certifications when hired:
  - Firefighter II.
  - Officer II.
  - Fire Inspector II.
  - Fire Investigator.

- The Fire Marshal, once hired, should be required to obtain within 24 months the following Utah Fire and Rescue Academy state certifications:
  - Fire and Life Safety Educator I.
  - Fire Inspector III.
- CPSM recommends the Fire Marshal position be placed in the Community Development Department in the near term and until other recommendations in this analysis are evaluated and implemented.
- In conjunction with the hiring of a full-time Fire Marshal, CPSM recommends the city develop a fire prevention occupancy inspection plan in accordance with Chapter 5-1-8(2) of the City Code that specifies, by occupancy type and occupancy address, the frequency of fire inspections. The frequency of inspections should be either annual or bi-annual and based on the hazard or mechanical processes performed, life safety and vulnerability of the population in the occupancy, frequency of fire incidents, type of fire protection systems, and if it is a public assembly. The highest hazards and threat to life safety and vulnerable populations are recommended to be inspected annually and all others bi-annually. Included in this plan should be the initial inspection of businesses and occupancies issued a new Business License and those mandated by a state department to be inspected annually.
- CPSM further recommends the city maintain the cadre of part-time certified Fire Inspectors to assist the Fire Marshal in carrying out the fire inspection plan. It is also recommended the number of part-time Fire Inspectors be expanded to four and that at least two of these inspectors be certified by the Utah Fire and Rescue Academy as Fire Investigators so that trained and certified fire investigators are available to respond to TCFD fire incidents to determine the cause and origin of fires.

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SECTION 4. ALL-HAZARDS RISK ASSESSMENT OF THE COMMUNITY

DEMOGRAPHICS

The 2020 decennial census population for Tooele City is 35,742 (U.S. Census Bureau). This is a 12.5 percent increase from the 2010 decennial population of 31,605. As the city is about 21.45-square miles, the population density based on the Census Bureau population data is 1,474/square mile.[12]

In terms of fire and EMS risk, the age and socio-economic profiles of a population can have an impact on the number of requests for fire and EMS services. Evaluation of the number of seniors and children by fire management zones can provide insight into trends in service delivery and quantitate the probability of future service requests. In a 2018 National Fire Protection Association (NFPA) report on residential fires, the following key findings were identified for the period 2011–2015:[13]

- Males were more likely to be killed or injured in home fires than females and accounted for larger percentages of victims (57 percent of the deaths and 54 percent of the injuries).
- The largest number of deaths (19 percent) in a single age group was among people ages 55 to 64.
- Half (50 percent) of the victims of fatal home fires were between the ages of 25 and 64, as were three of every five (62 percent) of the non-fatally injured.
- One-third (33 percent) of the fatalities were age 65 or older; only 15 percent of the non-fatally injured were in that age group.
- Children under the age of 15 accounted for 12 percent of the home fire fatalities and 10 percent of the injuries. Children under the age of 5 accounted for 6 percent of the deaths and 4 percent of the injuries.
- Adults of all ages had higher rates of non-fatal fire injuries than children.
- While smoking materials were the leading cause of home fire deaths overall, this was true only for people in the 45 to 84 age group.
- For adults 85 and older, fire from cooking was the leading cause of fire death.

In Tooele City the following age and socioeconomic factors are considered herein when assessing and determining risk for fire and EMS preparedness and response:[14]

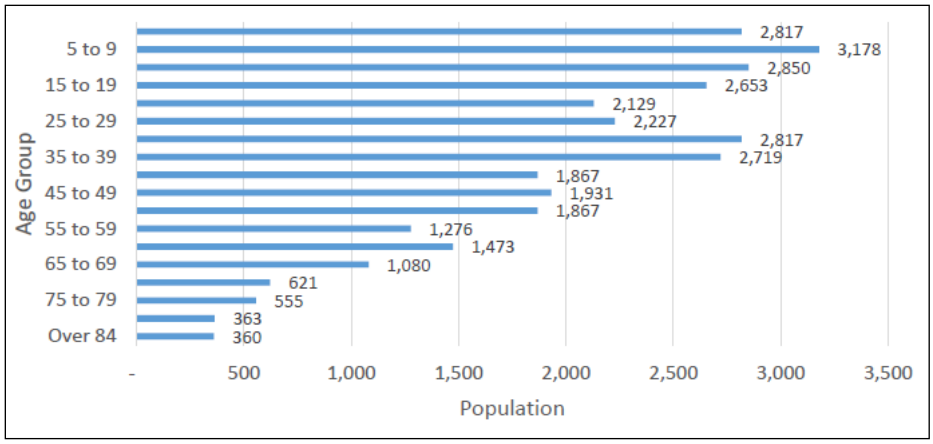
- Children under the age of five represent 8.3 percent of the population.
- Persons under the age of 18 represent 31 percent of the population.
- Persons over the age of 65 represent 9.2 percent of the population.
- Female persons represent 51.4 percent of the population.

12. U.S. Census Bureau Quick Facts, Tooele City, Utah.
13. M. Ahrens, "Home Fire Victims by Age and Gender", Quincy, MA: NFPA, 2018.
14. https://www.census.gov/quickfacts/elmiragecityarizona

- There are 3.13 persons per household in Tooele City.
- The median household income in 2019 dollars is $63,851.
- Persons living in poverty make up 7.7 percent of the population.
- Black or African-American alone represent 0.5 percent of the population. The remaining percentage of population by race includes White alone at 88.3 percent, American Indian or Alaska Native alone at 0.7 percent, Asian alone at 0.3 percent, two or more races at 4.3 percent, and Hispanic or Latino at 14.8 percent.

The next figure, although it uses 2016 information, provides a perspective of the age risk in Tooele City when benchmarked against the NFPA fire risk report on residential fires. Tooele City has significant population in the NFPA residential fire risk categories.[15]

FIGURE 4-1: Tooele City Population by Age Groups



It is estimated the population of the city will continue to increase as illusrated in the projections in the following figure.

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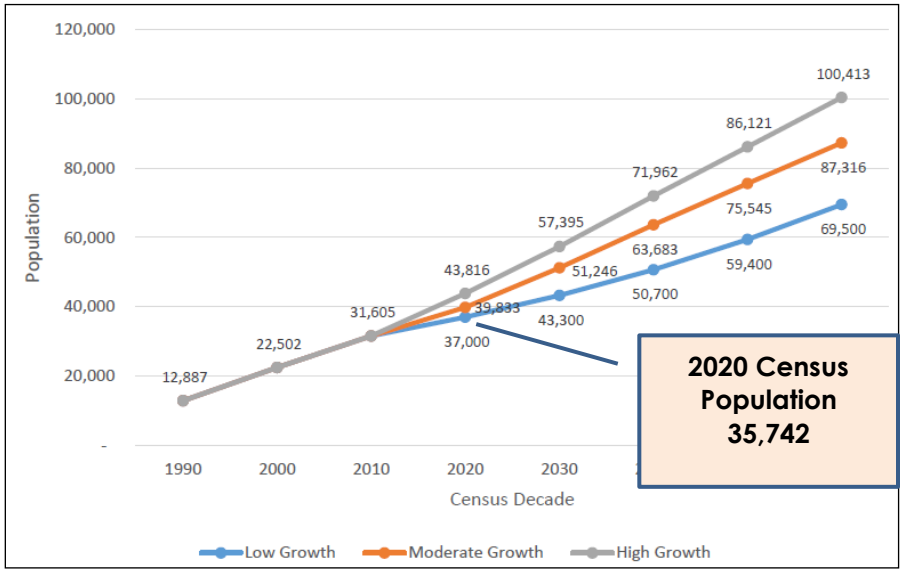
[15] 2020 Tooele City General Plan

FIGURE 4-2: Tooele City Population Growth Projections[16]



The city is poised for population growth as illustated in the figure above. The land use map and projected growth map in the next two figures illustrate areas of the city in which this growth is likely to occur in terms of buildings. Some areas of residential growth illustrated in the projected growth map are speculative and are dependent on rezoning in some cases. It is important the city recognize this expected growth in population and buildings will be a driver for an increase in service demands on the TCFD.

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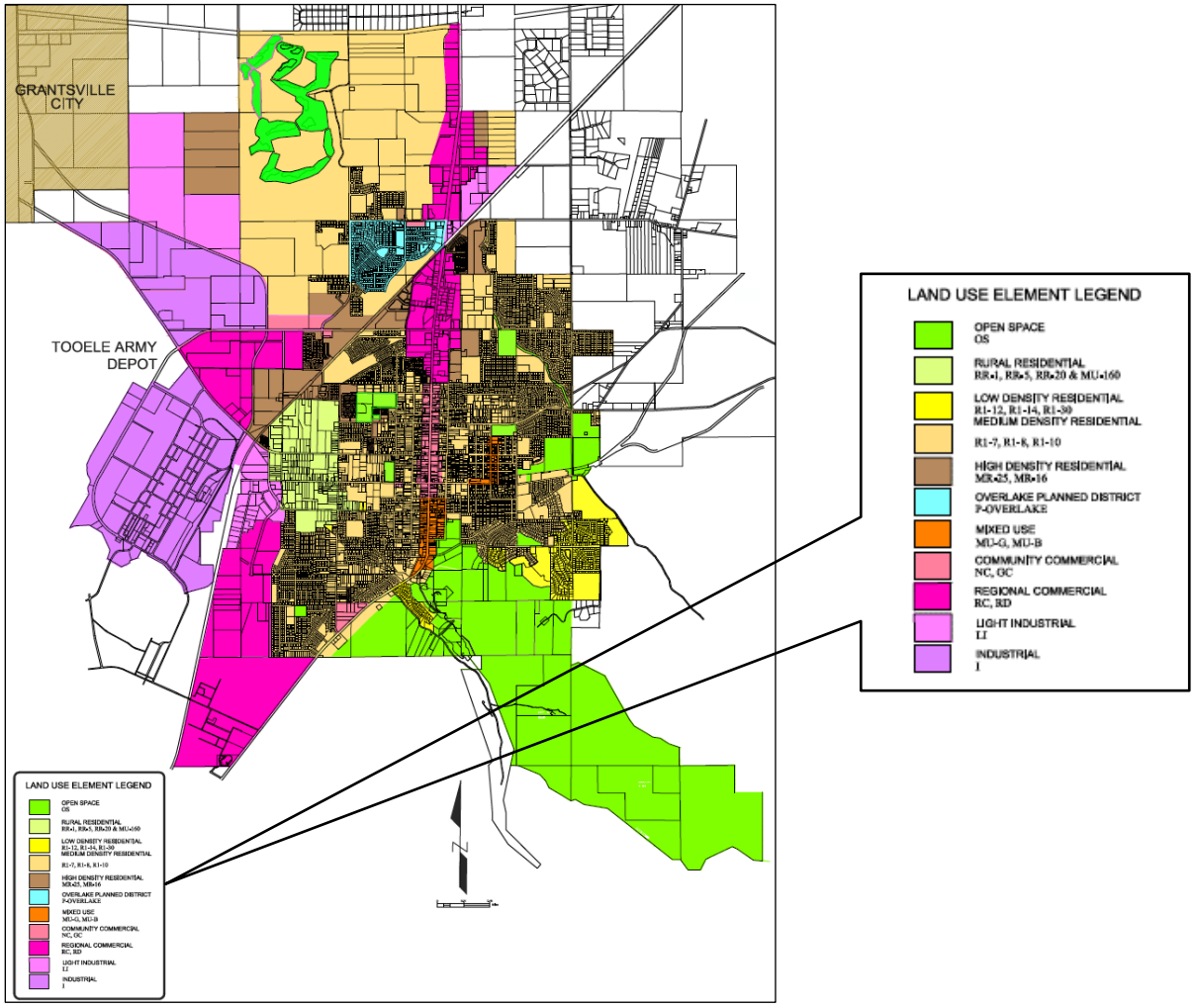
[16] Ibid.

FIGURE 4-3: Tooele City Land Use Map[17]



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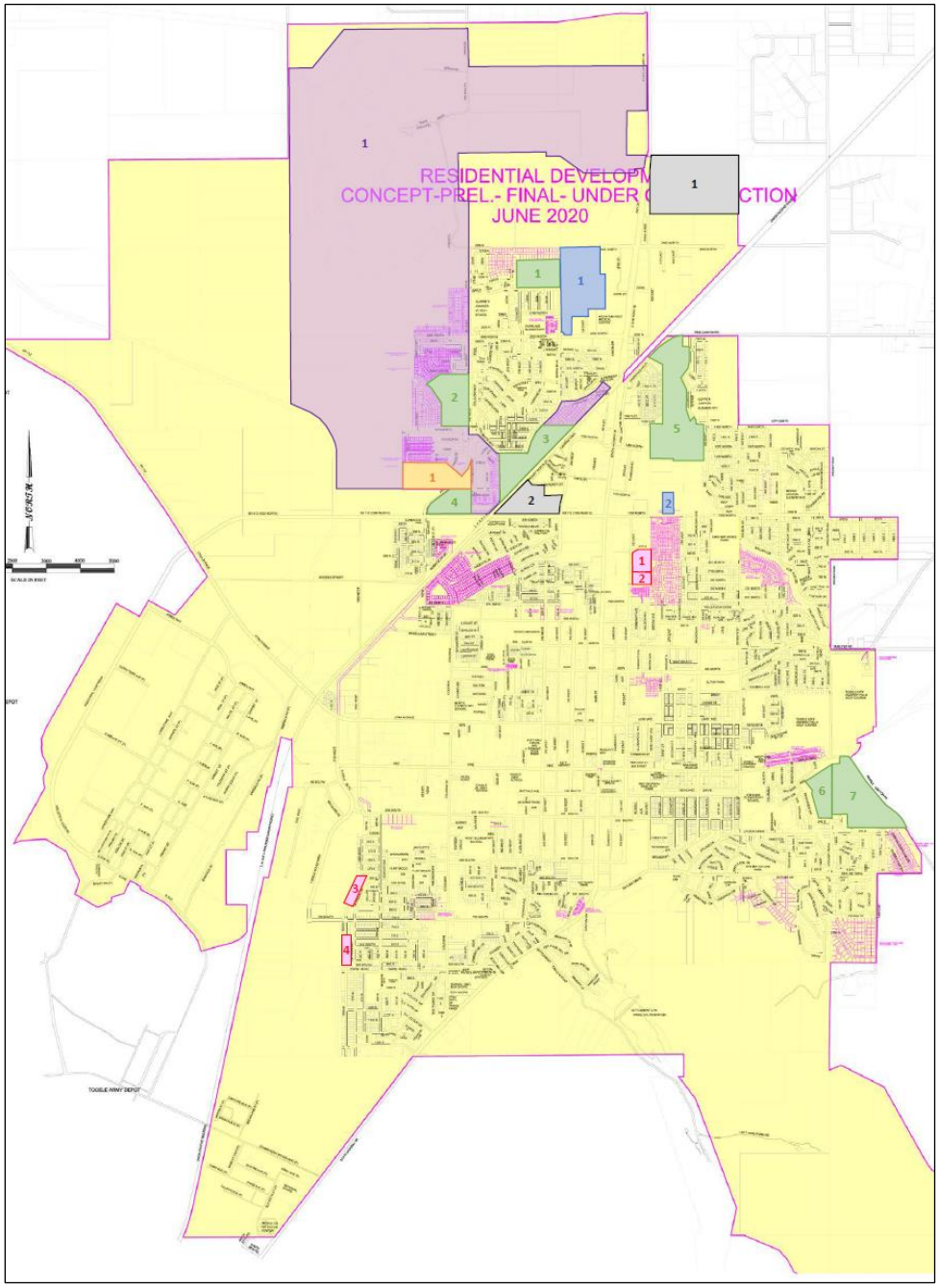
17. 2020 Tooele City General Plan

FIGURE 4-4: Tooele City Conceptual Residential Growth



Green Block Areas
1. 80 Units*
2. 170 Units*
3. 130 Units*
4. 230 Units*
5. 850 Units*
6. 30 Units*
7. 140 Units**

Red Block Areas
1. 132 Units
2. 74 Units
3. 84 Units
4. 84 Units

Orange Block Areas
1. 365 Units*

**indicates speculative*

***indicates very speculative*

Gray Block Areas
1. 600 Units***
2. 340-530 Units***

Blue Block Areas
1. No dwelling units
2. 74 units

**** indicates speculative and incumbent on rezoning approval*

ENVIRONMENTAL FACTORS

The City of Tooele is prone to and will continue to be exposed to certain environmental hazards that could have impacts on the community. The environmental risks with the highest potential for impact include flooding from rain, snow melt, and dam failure; severe weather to include summer thunderstorms with hail and intense winds, significant winter storms with heavy snow and wind, and extreme temperatures (cold and hot); landslides; wildfire; and steep slopes.[18] Of lower frequency potential, but significant in terms of community impact, are earthquake risks.

Specifics of environmental risks are included in the next table; this summary was taken from the 2016 Tooele County Pre-Disaster Mitigation Plan specific to Tooele City.

TABLE 4-1: Tooele City Environmental Hazards

Dam Failure Tooele's risk of dam failure involves the portions of the jurisdiction located below the Great Salt Lake from the north and Settlement Canyon Reservoir from the south. If these dams were to become breached, populations, structures, lands, amenities, and infrastructure adjacent to the dam could suffer serious impacts. Dam failure is the greatest risk to human life and structures in the community with potential to impact over 16,000 residents and nearly 5,000 structures.	**Steep Slopes** Tooele City has risk associated with steep slopes within its boundaries. Areas of greatest concern have slopes of more than 25 percent, which are commonly found in hilly and mountainous areas and areas bordering drainages, streams, and rivers. Steep slopes have the potential to impact life, property, and agricultural features. Nearly 300 residents and 100 structures are at risk within the jurisdiction for steep slopes.
Flood Portions of Tooele City are at risk to flooding. Areas most susceptible to flooding are portions of the community west of Main Street, south of 400 South, and areas west of Coleman St, as well as portions of the Settlement Canyon drainage below the reservoir. Other areas at risk of flood include Middle Canyon drainage through the northeast portions of the city. Floods resulting in these areas pose a threat to human life, structures, critical facilities, infrastructure, and other environmental, recreational, and agricultural amenities and lands within city limits.	**Flood (Soils)** Portions of Tooele City are at risk to flooding based on soils data. Although rare, most of these soils are located where drainage below Settlement Canyon Reservoir occurs and out through the west portion of the city. Other areas at risk of flood include Middle Canyon drainage throughout the northeast portions of the city. Flooded soils in these areas pose a threat to human life, structures, critical facilities, infrastructure, and other environmental, recreational, and agricultural amenities and lands within city limits.

18. Tooele County Pre-Disaster Mitigation Plan

Landslides	Wildfire
Isolated portions of Tooele City could suffer potential losses to landslides. Populations, structures, infrastructure, amenities, and lands that are most likely to be impacted include eastern and southern portions of the city. Landslides have the potential to impact environmental and agricultural features in the jurisdiction.	Tooele City is susceptible to moderate-high risk of wildfire in isolated portions of the city, such as the benches and hilly areas adjacent to the mountainous areas and areas with steeper slopes or grassy and shrubby vegetation. Areas at risk in the city are those in proximity to urban forests and development. Wildfires have the potential to impact over 6,000 people in the city, as well as 2,121 residential and commercial structures.

BUILDING AND TARGET HAZARD RISKS

A community risk and vulnerability exercise will evaluate the community as a whole, and with regard to buildings, measures all buildings and the risks associated with each property and then segregate the property as either a high-, medium-, or low-hazard depending on factors such as the life and building content hazard, and the potential fire flow and staffing required to mitigate an emergency in the specific property. According to the NFPA *Fire Protection Handbook*, these hazards are defined as:

High-hazard occupancies: Schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life-hazard (vulnerable population) or large fire-potential occupancies.

Medium-hazard occupancies: Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.

Low-hazard occupancies: One, two, or three-family dwellings and scattered small business and industrial occupancies.[19]

The construction type for residential structures in Tooele City is a mix of wood frame with wood or composite siding, and wood frame with brick veneer built on slab and crawl space with some having basements.

Townhomes, duplexes, and apartments are also common in Tooele City. Typical construction includes wood frame with wood or composite siding, and wood frame with brick veneer. Some apartment complexes include more than one floor level structures and have multiple buildings in a campus footprint.

The city does have an assortment of manufactured homes as well, which are typically made of light metal/wood construction with various exterior coverings. The commercial/industrial structure building inventory is primarily ordinary (block/brick) construction, wood frame with composite siding, and masonry non-combustible.

19. Cote, Grant, Hall & Solomon, eds., *Fire Protection Handbook* (Quincy, MA: National Fire Protection Association, 2008), 12.

Tooele City has the following building types:

- Single-family homes comprise the largest building risk with 10,486 units, many greater than 3000 square feet and built of lightweight wood construction and include basements.
- Townhomes, duplexes, quads, and apartments represent the largest population density risk with 1,902 total units.
- Commercial/industrial structures: approximately 440.
- Professional businesses occupying single or multiple suites in a single structure.
- Strip malls: 29 (multiple business/commodity risk).
- Hotel structures of more than one floor level and single floor level (life safety density risk).
- Assisted living/long-term care structures (vulnerable population risk).
- Public education structures: eight elementary schools, two middle schools, and one high school with an additional high school scheduled to open in 2025.
- Public government buildings.
- Correctional institutions (Tooele County Detention Center).
- Hospitals/medical centers (Mountain West Medical Center).

In terms of identifying target hazards, consideration must be given to the activities that take place (public assembly, life-safety vulnerability, manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped, imprisoned, etc.), and other specific aspects related to the construction of the structure.

Tooele City has a variety of **target hazards** that include:

- Hospital/medical center target hazards (life safety, hazardous gas use) at Mountain West Medical Center.
- Multistory, wood-frame apartment buildings with common attics.
- Multistory renovated school that now has condominiums on the top two floors.
- Hotel target hazards (life safety). There are hotels in the city, some of which are multistory including the Kirk Hotel downtown, which is four stories.
- Correctional institution target hazard (life safety/access).
- Educational/school/public assembly target hazard (life safety). Within the city limits and under construction is the 70,000 square-foot Deseret Peak Utah Temple.
- Mercantile/Business/Industrial (life safety, hazardous storage and or processes).
- Long-term care target hazard (life safety, vulnerable population).
- Government infrastructure target hazard (hazardous storage/processes and continuity of operations).
- Government business target hazards (life safety, continuity of operations).
- Private business target hazards (life safety).

The city has a mix of low- and medium-risk structures that make up most of the building target hazard risk. High-hazard building risks are noted in this section as well. These include correctional institutions, assisted/long-term care facilities, residential structures housing a vulnerable population, hospital/medical centers, public assembly structures when occupied, and those that have hazardous materials used in processes or that are stored in large quantities.

Industrial Depot

Within the city boundaries is an 800-acre industrial depot where a wide mix of warehouse-production, industrial, and distribution buildings are located. The area the depot occupies is a former U.S. Army site and many current buildings are vintage WWII industrial buildings, some large footprint with wood frame construction features. This site also includes modern industrial, warehouse distribution, and production buildings, some of which are large footprint buildings that pose several risks to firefighters. Larger building footprints range from the 20,000 square-foot Airgas Inc. medical and specialty gas distribution center to the 600,000 square-foot Cabela's distribution center.

While the modern, large-footprint buildings are typically built of fire resistive structural members and are sprinklered, they typically contain internal combustible accessories, storage, processes, and internal structures. While the life-safety hazard normally will not require extensive rescue by firefighting forces (in terms of the number of people on premises at one time to be rescued), the scope and complications of the larger footprint to be covered by initial attack lines and in a search and rescue undertaking typically raise these types of structures to a higher hazard.

Also included on the property are many spherical buildings that once were used to store miliary vehicles. These are now used as self-storage units; these pose a risk to firefighters as they do not know what is stored in a structure should they respond to an incident in one of these buildings. Finally, there is a variety of smaller buildings that serve as shops, storage, multi-use, and offices. These range in size from 1,200 square feet to 10,000 square feet.

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The next figure illustrates the mix of large footprint building types on the industrial depot property.

FIGURE 4-5: Tooele City Industrial Depot Large Footprint Buildings

Former Army Depot Buildings

Contemporary Large Footprint Buildings

The next figure illustrates the area of the industrial depot with current buildings and occupants.

FIGURE 4-6: Tooele City Industrial Depot Footprint

Building #	Address
600	345 S. Lodestone Way
601	400 S. Kira Drive
604	1865 W. D Avenue
605	505 S. Brenda Place
607	1845 W. D Avenue
608	520 S. Garnet Street
611	330 S. Kira Drive
612	345 S. Kira Drive
613	360 S. Jade Street
614	385 S. Jade Street
615	1900 W. D Avenue
616	1885 W. E Avenue
617	390 S. Jake Court
618	1855 W. E Avenue
619	450 S. Garnet Street
620	225 S. Lodestone Way
624	490 S. Racetrack
627	365 S. Jade Street
631	1835 W. G Avenue
637	252 S. Halite Street
641	1820 W. G Avenue
650	40 N. Lodestone Way
651-04	1735 W. I Avenue
655	1875 W. G Avenue
657-04	55 S. Iron Street
659-04	90 S. Garnet Street
661	1730 W. I Avenue
667	40 N. Iron Street
670	210 N. Lodestone Way
671	1645 W. K Avenue
801	545 N. Lodestone Way
2003	1500 Atlas Way
2010	1500 Atlas Way

585	480 S. Alexander Dr	651-02	1735 W. I Ave
587	1898 W. D Ave	657-02	55 S. Iron St
590	505 S. Alexander Dr	659-02	90 S. Garnet St
595	1995 W. B Ave	660	120 N. Lodestone Way
600A	385 S. Lodestone Way	669	10 S. Garnet St
600B	360 S. Lodestone Way	713	160 S. E Ave
602	405 S. Kira Dr	2000	1500 Atlas Way
602A	1995 W. C Ave	2001	95 S. Glenn Court
603	440 S. Jade St	2002	145 S. Glenn Court
606	485 S. Brenda Place	2004	80 S. Glenn Court
610	1975 W. E Ave	2005	84 S. Glenn Court
621	1881 W. F Ave	2006	100 S. Glenn Court
630	135 S. Lodestone Way	2007	71 S. Glenn Court
632	92 Lodestone Way	2008	100 S. Glenn Court
638	1775 W. F Ave	2009	148 S. Glenn Court
638A	1800 W. E Ave	2011	1500 W. Atlas Way
639	230 S. Garnet St	2012	1500 W. Atlas Way
640	55 S. Lodestone Way	2013	1500 W. Atlas Way
647	115 S. Iron St	2020	149 S. Glenn Court
649	180 S. Garnet St	2025	150 S. Feldspar

TRANSPORTATION FACTORS

The road network in Tooele City is typical of the cities that CPSM has studied. As represented in the 2021 Tooele City Transportation Master Plan, this includes arterial streets, which carry higher volumes of traffic such as SR 36 (Main Street); major/minor collector streets that move traffic from one end of the city to the other (north to south and east to west) such as Coleman St., 200 West, 100 West, 100 East, Broadway Ave., 7th St., and Droubay Rd. (north to south); and 1000 North 700 South, 200 South, Vine St., Utah Ave., 200 North, 400 North, 2000 North, and 2400 North (east to west). Tooele City also has a vast network of local streets, which provide connection to the major road network as well as residential and commercial land uses.

Much of the local network has been planned in a grid system, which offers supportive connection of roads for emergency response. Some local roads are not connected or end in cul-de-sacs; this will hamper emergency operations from the perspective of apparatus positioning or roadway obstructions. Truck routes in the city have been designated as well.

The next figure illustrates the existing road network in Tooele City and the current level of service. The level of service is a quantitave measurment of the performance of an intersection or roadway. The quantitave analysis produces measurements from A to F, with A having the best performance and F having the worst performance. Level of service is important to fire and EMS in terms of ability to repond to emergencies over the existing road network and understanding where at certain times of the day the level of service is reduced and alternate routes may have to be taken to ensure timely response.

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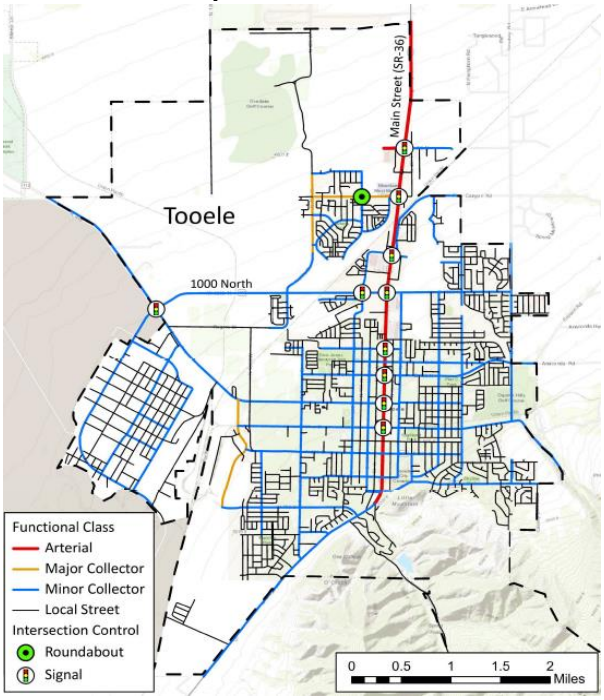
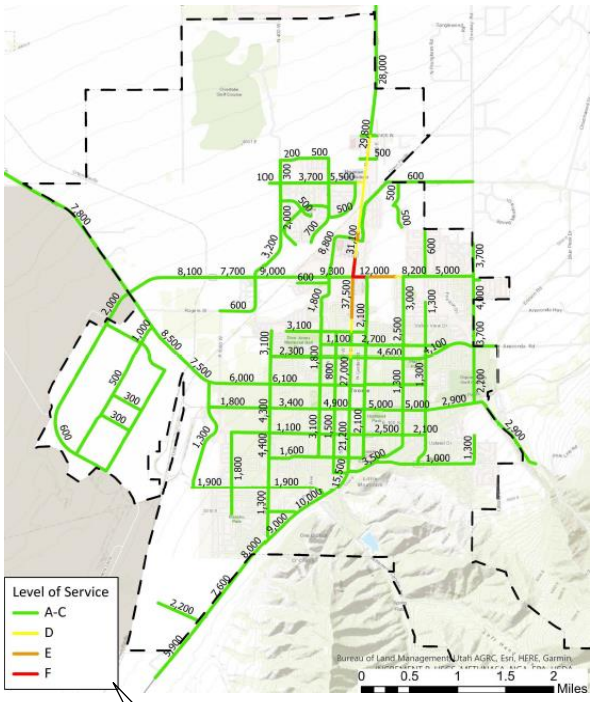
FIGURE 4-7: Tooele City Road Network and Level of Service

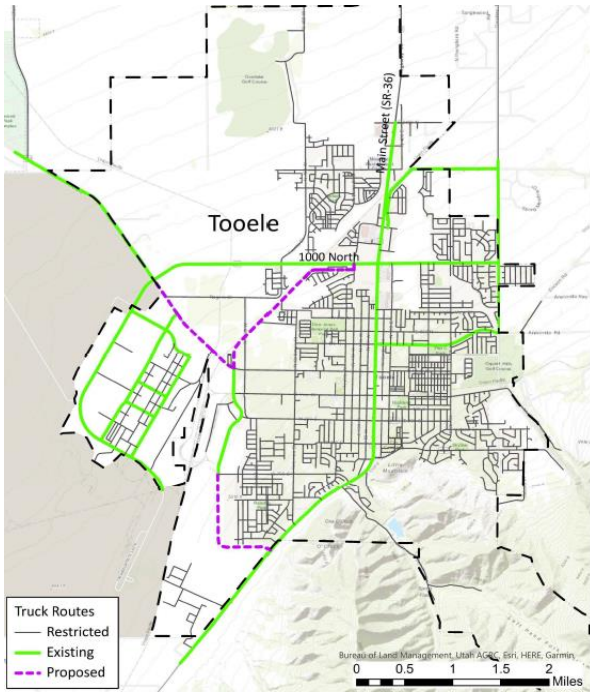
Tooele City Current Road Network

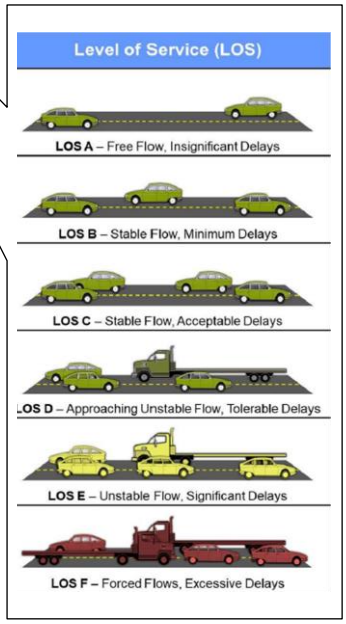


Road Network Level of Performance



Tooele City Truck Route Network

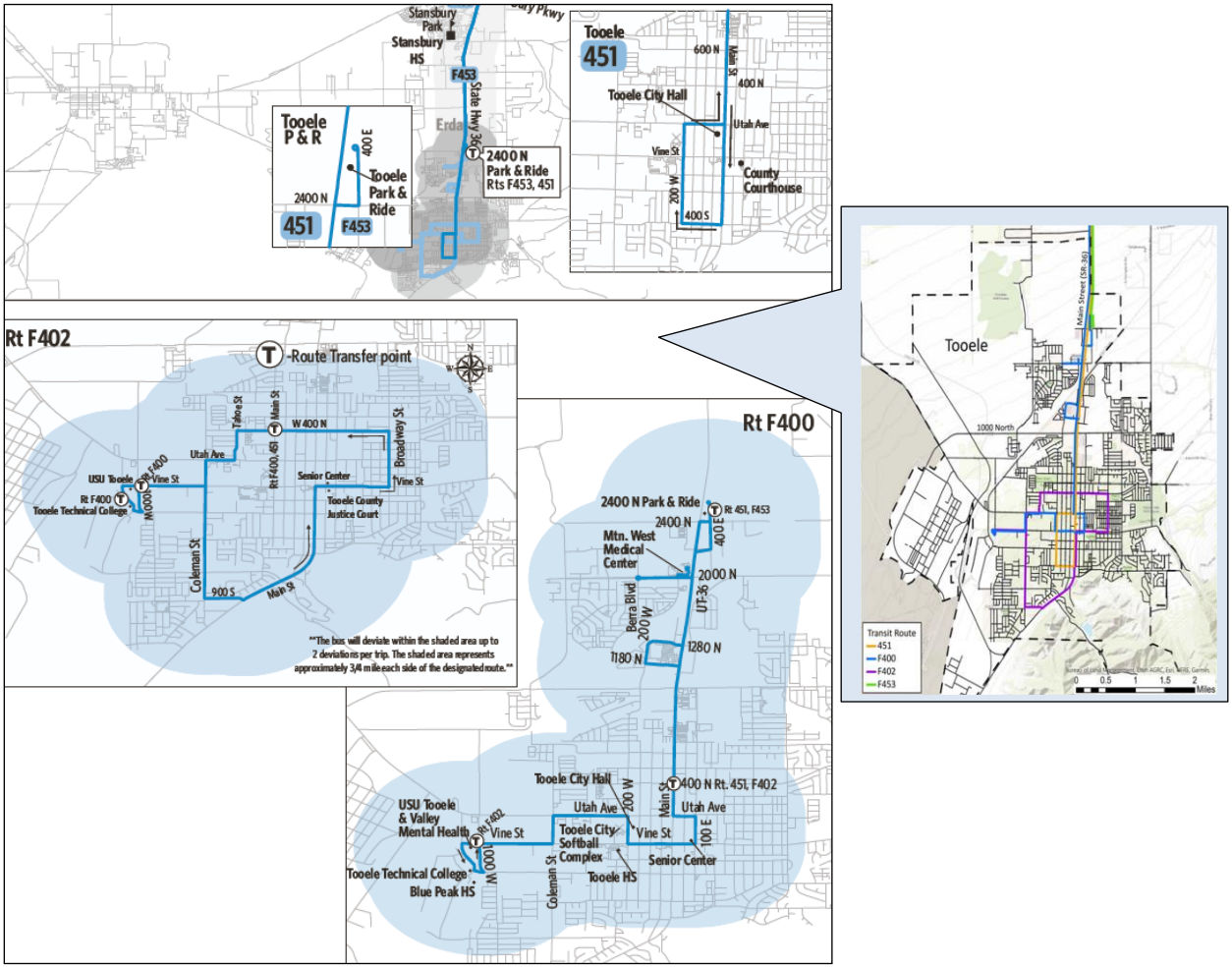




The Utah Transity Authority provides public transportation (bus) in Tooele City. This includes outgoing bus routes from Tooele City to Salt Lake City and incoming bus routes from Salt Lake

City to Toolele City. This includes a fixed route (451) and flex routes (F 400, F402, F453). Flex routes can deviate from their fixed route by up to three-quarerts of a mile. The next figure illustrates the bus routes in Tooele City. These routes operate on weekdays.

FIGURE 4-8: Tooele City Bus Routes



The road network described herein poses risks for a vehicular accident, some at medium to greater than medium speeds, as well as vehicular-versus-pedestrian risks. There are additional transportation risks since tractor-trailer and other commercial vehicles traverse the roadways of Tooele City to deliver mixed commodities to business locations. Fires involving these products can produce smoke and other products of combustion risks that may be hazardous to health. Bus accidents during rider-populated rides pose a mass casualty response risk if multiple riders are injured.

Tooele City also has active railroad tracks that pass through the city. Union Pacific is the primary rail line; freight commodities are the primary consist of the trains. Primary freight (received and shipped) in the state includes intermodal (containers and trailers), minerals, hazardous wastes, hazardous materials, coal, metallic and non-metallic minerals, and lumber.[20] Salt Lake City has a large inland intermodal terminal that contributes to the rail traffic in Tooele City.

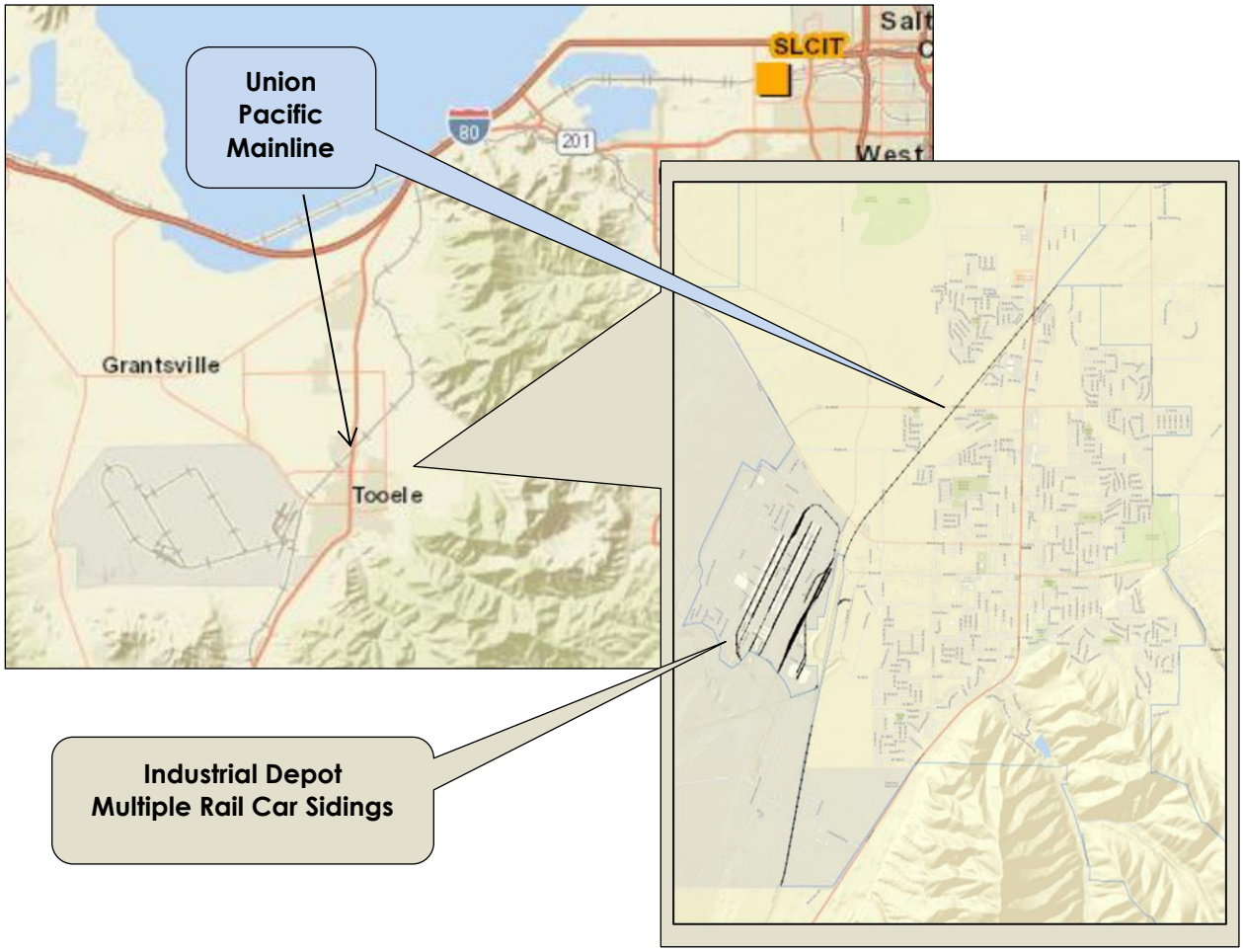
20. www.up.com, State by State Guide, Union Pacific in Utah

The industrial depot discussed above also has an internal rail yard that includes multiple sidings with rail cars stored for loading and off-loading purposes. Siding rail freight cars may include hazardous materials and hazardous wastes among other combustible materials. The industrial depot also operates its own internal rail service used to move cars around the many sidings for use by the various businesses.

Fires involving the potential commodities passing through and stored in sidings in Tooele City can produce smoke and other products of combustion risks that may be hazardous to health. Hazardous materials (existing or waste) themselves present hazards to health risks if being transported and involved in a rail accident.

The next figures illustrate rail in the region as well as rail in the city. At-grade crossings exist in the city and pose transportation accident risks.

FIGURE 4-9: Rail in Tooele City



FIRE AND FIRE-RELATED RISK

An indication of the community's fire risk is the type and number of fire-related incidents to which the fire department responds. CPSM conducted a data analysis for this project that analyzed TCFD incident responses and workload. During the period studied, the TCFD arrived at 260 fire-related calls for service in the city during the 2019 study period. The following table details the call types and call type totals for these fire-related risks.

TABLE 4-2: Fire Call Types 2019*

Call Type	Number of Calls	Calls per Day
False alarm	103	0.3
Good intent	24	0.1
Hazard	79	0.2
Outside fire	29	0.1
Public service	7	0.0
Structure fire	18	0.0
Fire total	**260**	**0.7**

Note: *Developed from the CPSM data analysis.

Key takeaways from the data in this table are:

- Fire calls for the year totaled 260, an average of just under one call per day (0.7 calls/day).
- False alarm calls were the largest category of fire calls at 40 percent of fire calls.
- Structure and outside fire calls combined totaled 47 calls for the year and made up 18 percent of fire calls for the year.

After the CPSM data analysis was completed, the TCFD provided updated incident data, which the department extracted from its NFIRS records management system. This data is presented here in the following table.

TABLE 4-3: Fire Call Types, 2020 and 2021*

2020			2021		
Call Type	**Number of Calls**	**Calls per Day**	**Call Type**	**Number of Calls**	**Calls per Day**
False alarm	134	0.4	False alarm	136	0.4
Good intent	15	0.0	Good intent	8	0.0
Hazard	90	0.2	Hazard	112	0.3
Outside fire	89	0.2	Outside fire	84	0.2
Public service	8	0.0	Public service	18	0.0
Structure fire	18	0.0	Structure fire	20	0.1
Fire Total	**354**	**0.8**	**Fire Total**	**378**	**1.0**

Note: *This data provided by TCFD absed on NFIRS records.

Key takeaways from the data in this table are:

- Fire calls for 2020 totaled 354 (0.8/day) and calls for 2021 totaled 378 (1.0/day).
- False alarm calls were the largest category of fire calls for both 2020 and 2021.
- Structure and outside fire calls combined totaled 107 in 2020 and 104 in 2021.

EMS RISK

As with fire risks, an indication of the community's pre-hospital emergency medical risk is the type and number of EMS calls that occur. The TCFD does not provide EMS first response with fire department apparatus and personnel other than motor vehicle accidents with entrapment or hazards, and to assist the private EMS service with bariatric patient movement.[21]

EMS pre-hospital care and ground transport in Tooele City is provided by Mountain West Medical Center (MWMC). Information relevant to EMS ground transport services includes:

- MWMC-EMS stages two EMS ground transport units in Tooele City on a regular basis and usually three during daytime peak call hours. The units are located at 950 North Main St. in Tooele City.
- The MWMC-EMS units are staffed at a minimum with one Paramedic and one Advanced EMT.
- The primary receiving hospital for EMS gound transport originating in Tooele City is Mountain West Medical Center located at 2055 North Main St. in Tooele City.
- The number of EMS transports originating in Tooele City for 2019, 2020, and 2021 were:
  - 2019: 1,183 transports
  - 2020: 1,295 transports
  - 2021: 1,506 transports

For 2019, 2020, and 2021 the number of EMS-related calls the TCFD responded to were:

- 2019: 7 calls.
- 2020: 22 calls.
- 2021: 16 calls.

ISO RATING

The ISO is a national, not-for-profit organization that collects and evaluates information in communities across the United States regarding their capabilities to combat building fires. The data collected from a community is analyzed and applied to ISO's Fire Suppression Rating Schedule (FSRS) from which a Public Protection Classification (PPC™) grade is assigned to a community (1 to 10).

21. In a two-tiered system, the fire department responds with Basic Life Support (BLS) certified staffing and BLS equipment, to include an Automated External Defibrillator (AED), and/or Advanced Life Support (ALS) certified personnel and ALS equipment and pharmaceuticals, and initiates patient care prior to EMS ground transport arrival.

A Class 1 represents an exemplary community fire suppression program that includes all of the components outlined below. A Class 10 indicates that the community's fire suppression program does not meet ISO's minimum criteria. It is important to understand the PPC is not just a fire department classification, but a compilation of community services that include the fire department, the emergency communications center, and the community's potable water supply system operator.[22]

A community's PPC grade depends on:

- **Needed Fire Flows** (building locations used to determine the theoretical amount of water necessary for fire suppression purposes).
- **Emergency Communications** (10 percent of the evaluation).
- **Fire Department** (50 percent of the evaluation).
- **Water Supply** (40 percent of the evaluation).

Tooele City has an ISO rating of ***Class 04/4X, the fourth highest rating achievable***. This rating became effective in June 2020. The final rating included the following credit by category:

- **Emergency Communications**: 7.01 earned credit points/10.00 credit points available.
- **Fire Department**: 37.47 earned credit points/50.00 credit points available.
- **Water Supply:** 35.85 earned credit points/40.00 credit points available.
- **Community Risk Reduction** (Fire Prevention/Inspection, Public Education, and Fire Investigation activities): 4.68 earned credit points/5.50 credit points available.

Overall, the community PPC rating yielded 67.25 earned credit points/105.50 credit points available. There was a 6.95 point diversion reduction assessed, which is automatically calculated based on the relative difference between the fire department and water supply scores. **60.00 points or more qualify a community for a rating of 4.**

The following figures illustrates the dispersion of PPC ratings across the United States and in Utah.

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22. TCFD ISO PPC report; November 2019.

FIGURE 4-10: PPC Ratings in the United States[23]

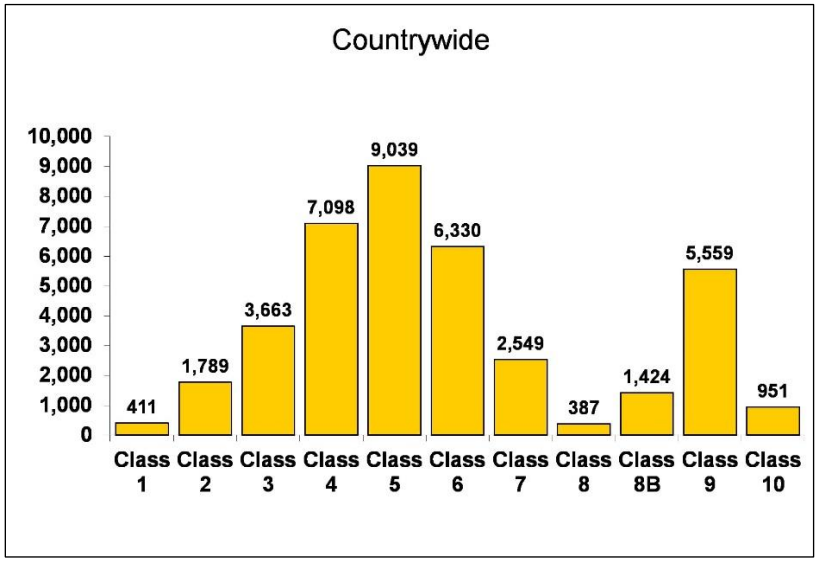
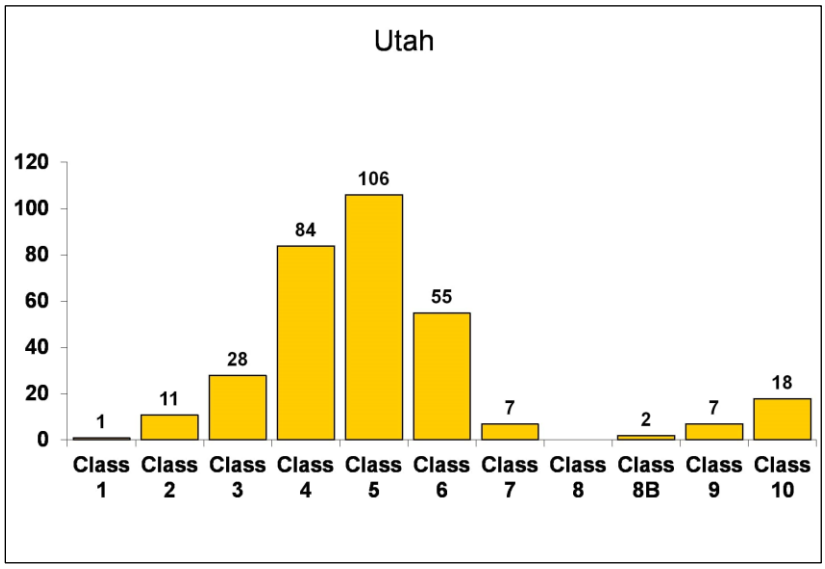


FIGURE 4-11: PPC Ratings in the United States[24]



Areas of scoring that should be reviewed further internally by the city and the TCFD are the following:

Fire Department

Item 561: Credit for Deployment Analysis: <u>4.81/10.0 Credits</u>

This section contemplates the deployment of engine and ladder companies against the percentage of built upon area within 1.5 miles of a first-due engine company and within 2.5 miles of a first-due ladder-service company.

23. https://www.isomitigation.com/ppc/program-works/facts-and-figures-about-ppc-codes-around-the-country/
24. Ibid.

This is addressed above in the facility section. Under the current two-station configuration, the TCFD deploys all its ladder apparatus from Station 2 and all of its engine apparatus from Station 1. This deployment strategy limits coverage for ladder apparatus at 2.5 miles and limits engine apparatus coverage at 1.5 miles. Alternatives that CPSM has suggested will improve this category if implemented under the proposed two- or three-station deployment strategy.

Item 5.71: Credit for Company Personnel: 4.38/15 Credits
This section contemplates the average number of on-duty personnel available to respond to fire calls, and links to deployment of companies for the built-upon areas of the city (1.5 miles for engines and 2.5 miles for ladders). Automatic aid is credited in this section. The FSRS recognizes 0.00 on-duty personnel and 21 on-call (volunteer) personnel based on their evaluation of response records.

According to the city's FSRS report:

> *On-call members are credited on the basis of the average number staffing apparatus on first alarms. For personnel not normally at the fire station, the number of responding firefighters and company officers is divided by 3 to reflect the time needed to assemble at the fire scene and the reduced ability to act as a team due to the various arrival times at the fire location when compared to the personnel on-duty at the fire station during the receipt of an alarm.*

CPSM will provide a more focused review of this in a later section of this analysis. It should be noted that this item can be improved by implementing response protocols where personnel respond to the station, assemble a crew of 2 to 3 on an apparatus, and then respond to the scene, which links to members responding and arriving at various times to the scene. Additionally, the TCFD can implement 1 to 2 duty crews of 2 to 3 personnel each during the weekday overnight hours and on weekend days and nights to staff one engine and one ladder apparatus more routinely to respond to incidents. Again, this links with members responding and arriving at various times to the scene.

Item 581: Training 2.48/9.0 Credits. Areas of significant concern are the following:

Section A-Facilities and Use: For maximum credit, each firefighter should receive 18 hours of training per year in structure fire-related subjects as outlined in NFPA 1001 at a training facility where props and fire simulation buildings can be used. The TCFD is not meeting this section to its fullest potential. **6.82/35 Credits**

Section B-Company Training: For maximum credit, each firefighter should receive 16 hours of training per month in structure fire-related subjects as outlined in NFPA 1001. The TCFD is not meeting this section to its fullest potential. **3.75/25 Credits**

Section D-New Driver and Operator Training: For maximum credit, each new driver and operator should receive 60 hours of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451. **2.5/5 Credits**

Section H-Pre-Fire Planning Inspection: For maximum credit, company members should annually make pre-fire planning inspections of each commercial, industrial, institutional, and other similar type building. Records of inspections should include up-to-date notes and sketches. TCFD is not completing pre-fire plans on targeted hazard buildings that are commercial, industrial, institutional, and other similar types. **0/12 Credits**

CPSM addressed several training issues in an earlier section in this analysis. This is an area in which the TCFD has many weaknesses as previously discussed and as highlighted in the ISO-FSRS report.

Of concern is the record keeping, adoption and management of guidelines that address training certifications and on-going incumbent training, and maintenance of required training by the department.

Of significance as well is that the department does not conduct, or if it does has no record of conducting, pre-fire planning inspections. Pre-fire planning inspections are company-level walk-throughs of commercial, industrial, institutional, hotels/motels, and larger footprint buildings to become familiar with floorplans, hose connections, means of egress, concentrations of population, hazardous materials storage, and the like. Typically, fire departments have templates they fill in while conducting these pre-fire plan inspections; these templates include pertinent owner/occupant information, sketched floor plans, hydrant locations, fire department connections, elevator locations, hazardous storage, or process locations in the building, etc. A very important purpose of a pre-fire plan is to have it available when an actual incident is occurring at the target hazard site or building. The pre-fire plan can provide the incident commander with vital information that he/she can reference when making incident decisions. The Industrial Depot with its variety of buildings, processes, commodities and commodity storage, and rail facilities is an example of where pre-fire planning would be beneficial to all members of the TCFD.

Water Supply Category

Item 630-Credit for Inspection and Flow Testing**: 2.4/7.0 Credits**

This item contemplates fire hydrant inspection and flow-testing frequency in the city, and the completeness of the inspections, to include documentation. This section is completed by the city's Public Works Department.

Frequency of Inspections: The City received **0.00/7.0 credits for this section**. This means fire hydrants have not been inspected in five years or more.

Frequency of Flow Testing: The City received **2.40/7.0 credits** for this section. This means the hydrants have not been flow tested for nine to ten years.

Community Risk Reduction Category

Item 1025-Fire Prevention Staffing: **1.46/8.0 credits**

This item evaluates adequate staff for fire prevention activities. As noted in this analysis, there are nearly 800 occupancies that have a Business License in Tooele City and which require fire inspections either annually by state statute, or on a temporal schedule where each occupancy receives an inspection on a bi-annual or tri-annual basis as outlined in a fire inspection plan.

Item 1025-Fire Prevention Training and Certification: **0.00/6.0 credits**

This item evaluates the training and certification of fire prevention personnel. This is addressed in other sections of the analysis; here it is noted again the TCFD does not have adequately certified and trained fire inspectors.

Recommendation:

- CPSM recommends the city and the TCFD develop a joint plan to address deficiencies in the current ISO Fire Service Rating Schedule review that was effective June 2020 and as outlined here regarding Fire Department Deployment Analysis, Company Personnel, Training (Facilities and Use, Company Training, New Driver and Operator Training, Pre-Fire Planning Inspection), and Water Supply (Inspection and Flow Testing).

COMMUNITY LOSS AND SAVE INFORMATION

Fire loss is an estimation of the total loss from a fire to the structure and contents in terms of replacement. Fire loss includes contents damaged by fire, smoke, water, and overhaul. Fire loss does not include indirect loss, such as business interruption.

In a 2019 report published by the National Fire Protection Association on trends and patterns of U.S. fire losses, it was determined that home fires still cause the majority of all civilian fire deaths, civilian injuries, and property loss due to fire. Key findings from this report include:[25]

- Public fire departments responded to 1,318,500 fires in 2018, virtually the same as the previous year.
- Every 24 seconds, a fire department in the United States responds to a fire somewhere in the nation. A fire occurs in a structure at the rate of one every 63 seconds, and a home fire occurs every 87 seconds.
- Seventy-four percent of all fire deaths occurred in the home.
- Home fires were responsible for 11,200 civilian injuries, or 74 percent of all civilian injuries, in 2018.
- An estimated $25.6 billion in property damage occurred as a result of fire in 2018, a significant increase, as this number includes a $12 billion loss in wildfires in Northern California.
- An estimated 25,500 structure fires were intentionally set in 2018, an increase of 13 percent over the year before.

The TCFD did not report or provide community loss information as recorded from incidents the department responded to for a five-year period for which CPSM requested information. Additionally, the TCFD did not report any fire or non-fire related injuries or fatalities during this same five-year period. That said, the TCFD did respond to 992 fire/service/hazardous type calls for service during 2019, 2020, and 2021. Typically fire departments across the nation record community loss in terms of property loss dollars of some type for these types of incidents, specifically for structural, vehicle, and outside fires. Over a five-year period there typically is some level of property/community save information as well. This information, when available, should be analyzed internally and applied to training, building and hazard recognition, as well equipment and apparatus decisions.

Fire Incident Demand

The fire and EMS risk in terms of numbers and types of incidents is important when analyzing a community's risk, as outlined above. Analyzing where the fire and EMS incidents occur, and the demand density of fire and EMS incidents, helps to determine adequate fire management zone resource assignment and deployment. For the TCFD, although there are two fire stations, the entire city serves as the fire management zone.

The following figures illustrate fire demand in the TCFD fire management zone. Figure 4-12 illustrates all fire calls; Figure 4-13 illustrates structural and outside fires; Figure 4-14 illustrates other types of fire-related incidents such as good intent and public service calls, which are calls for

25. https://www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Fire-loss-in-the-United-States

service such as smoke scares (no fire), wires down, lock outs, water leaks, etc.; Figure 4-15 illustrates the call density of false alarms, which typically are fire alarm.

For planning purposes, the maps in these figures show incidents in relation to the TCFD's current two-station alignment and in relation to a three-station alignment with the addition of Station 3.

The following four demand maps tell us that:

- Fire calls are concentrated in the central built-upon area of the city. There is demand north and east of the proposed Station 3, which provides further justification for this station. The call demand also shows the limited service area by demand for Station 2.
- Structure/outside fire-related and EMS incident demand is concentrated in two areas, the north and south areas of the city, with a slightly higher demand just south and east of the proposed Station 3.
- Other non-fire call types such as good intent and public service calls, which are calls for service such as smoke scares (no fire), wires down, lock outs, water leaks, etc., are concentrated along Main Street in the central built-upon area of the city and north and east of Station 1 and the proposed Station 3.
- Fire/false alarm demand is concentrated in three areas of the city and includes the middle portion of the city, southwest, and north and east of the proposed Station 3.

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FIGURE 4-12: Fire Incident Demand Density (All Fire Calls)

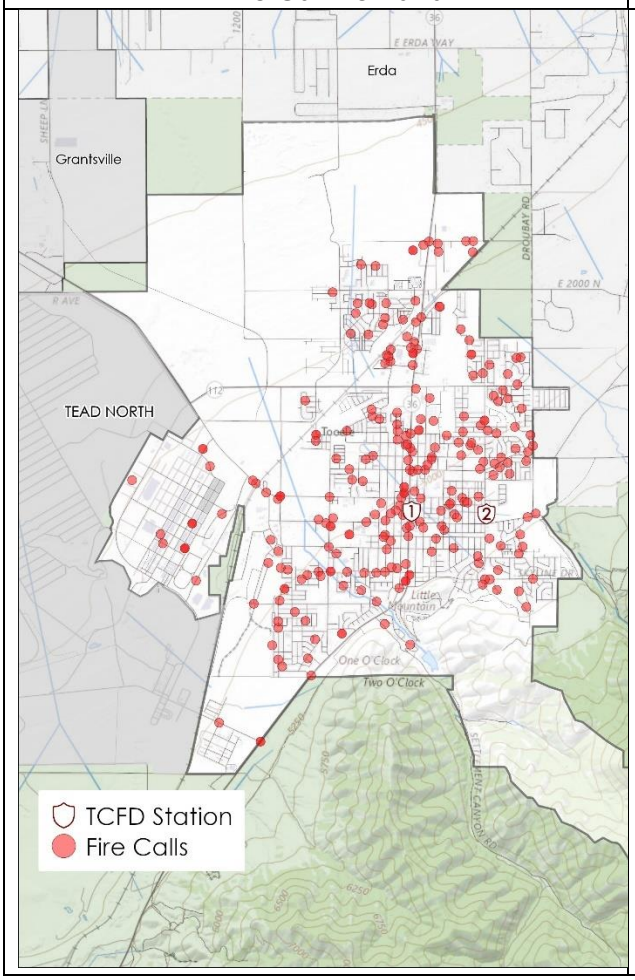
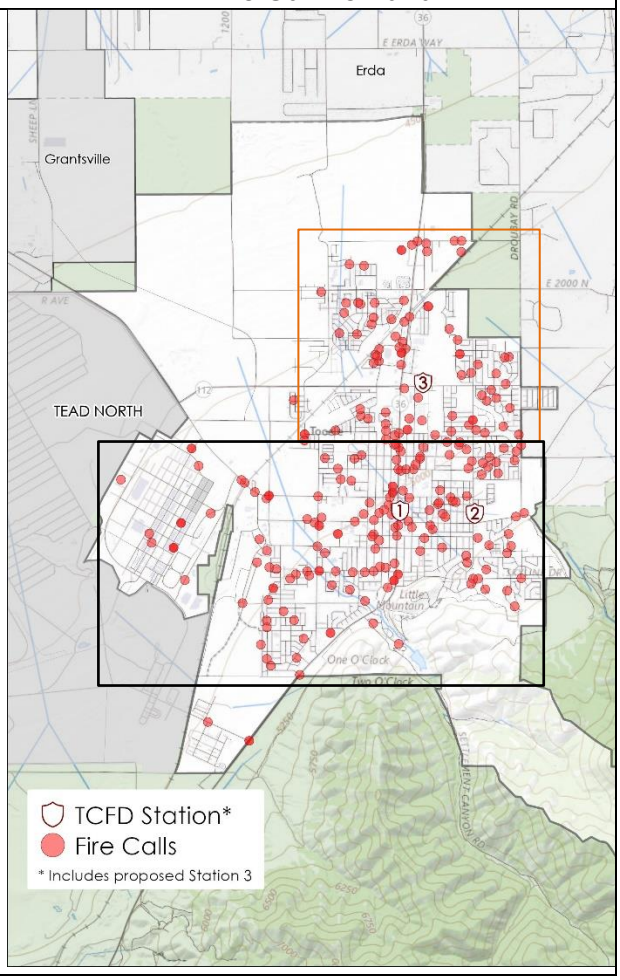
Current Stations with All Fire Call Demand	Current Stations and Proposed Station 3 with All Fire Call Demand
	

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FIGURE 4-13: Fire Incident Demand Density (Structure and Outside Fires)

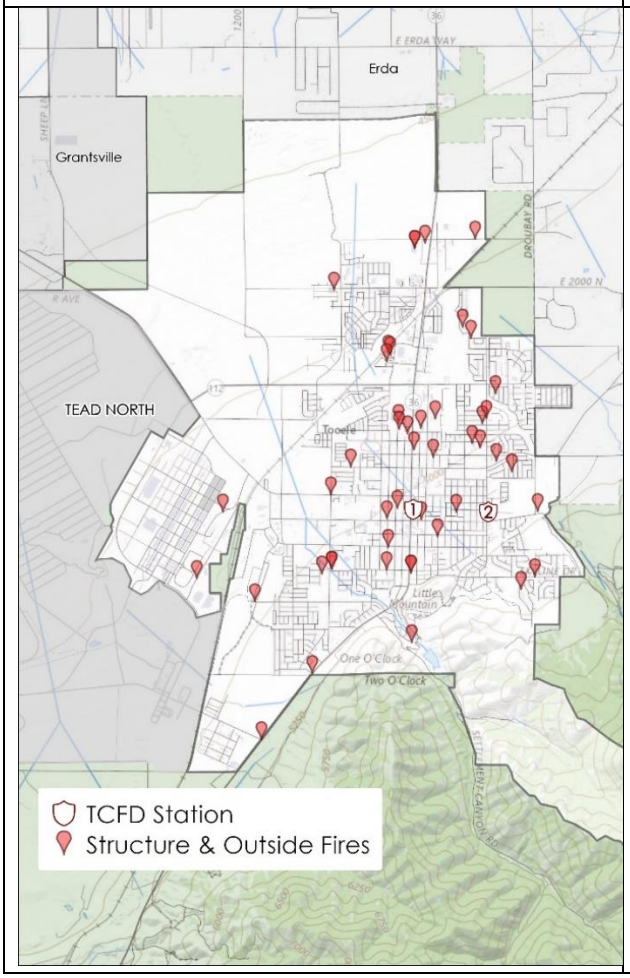
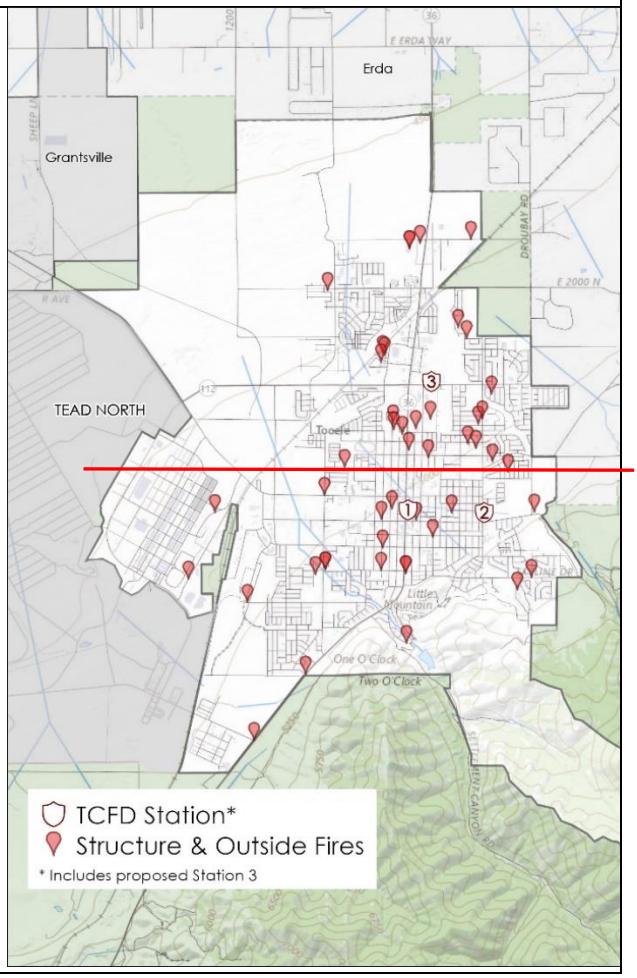
Current Stations with Structure and Outside Fire Demand	Current Stations and Proposed Station 3 with Structure and Outside Fire Demand
	

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FIGURE 4-14: Other Fire-Related Incident Demand Density

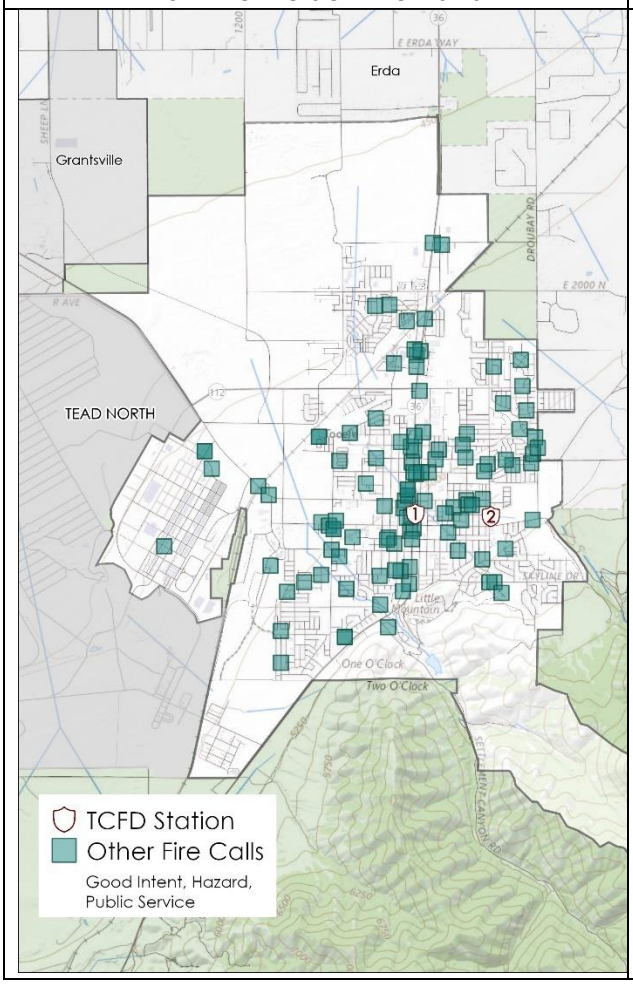
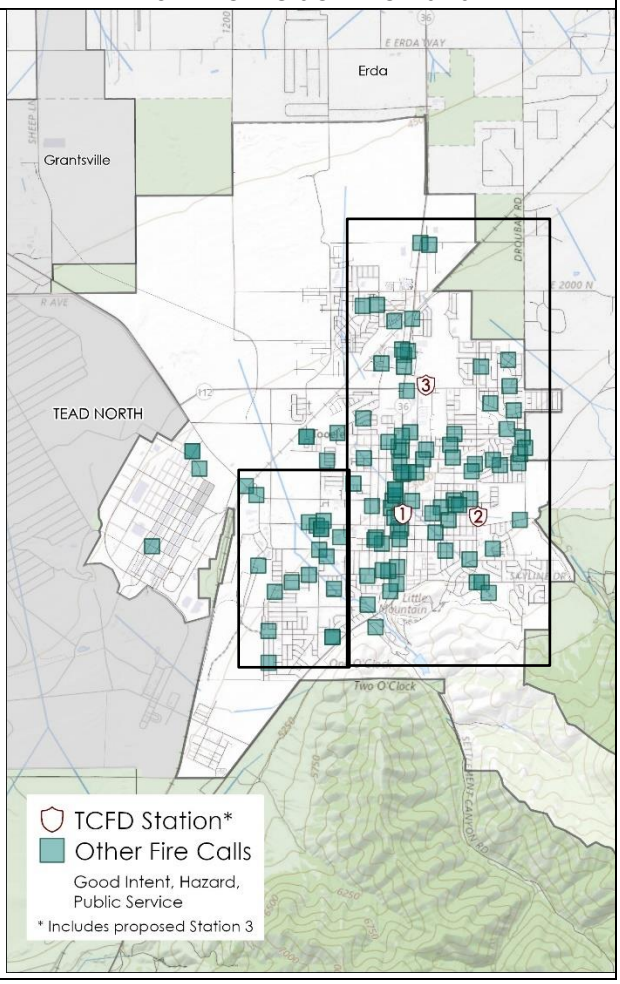
Current Stations with Non-Fire Incident Demand	Current Stations and Proposed Station 3 with Non-Fire Incident Demand
	

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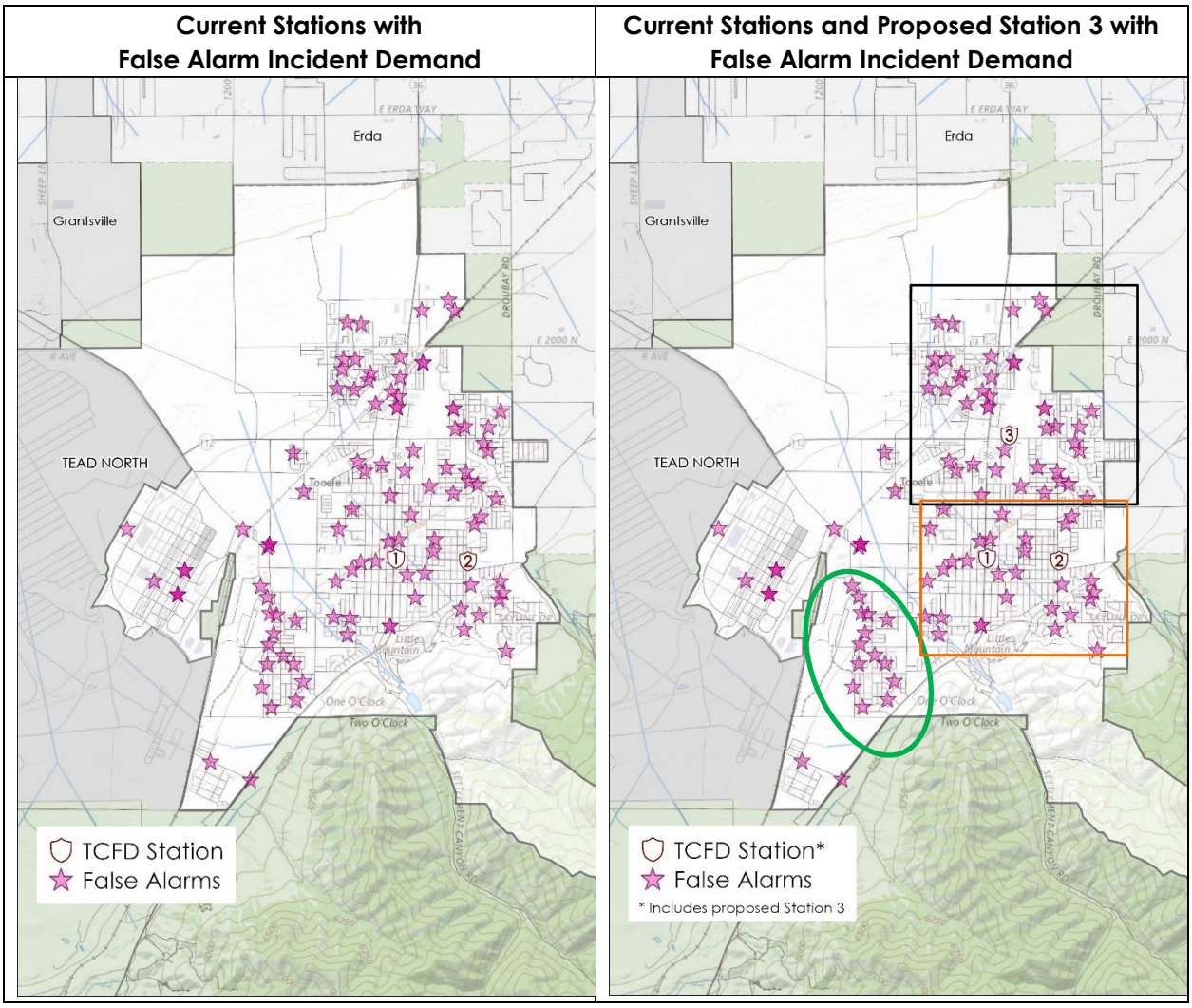
FIGURE 4-15: False Alarm Incident Demand Density



RESILIENCY

Resiliency as defined by the Center for Public Safety Excellence (CPSE) in the FESSAM 9th edition as "an organization's ability to quickly recover from an incident or events, or to adjust easily to changing needs or requirements." Greater resiliency can be achieved by constant review and analysis of the response system and focuses on three key components:

- Resistance: The ability to deploy only resources necessary to safely and effectively control an incident and bring it to termination, which is achieved through the development and implementation of critical tasking and its application to the establishment of an effective response force for all types of incidents.
- Absorption: The ability of the agency to quickly add or duplicate resources necessary to maintain service levels during heavy call volume or incidents of high resource demand.
- Restoration: The agency's ability to quickly return to a state of normalcy.

Resistance is controlled by the TCFD through staffing and response protocol, and with TCFD resources dependent on the level of available volunteer members and units available at the time of the alarm.

Absorption is accomplished through available TCFD units and volunteer members ready respond as simultaneous calls occur.

Restoration is managed by TCFD unit availability, recall of volunteers to staff fire units during campaign events when warranted, and efficient work on incidents for a quick return to service.

Regarding resiliency, the following four tables analyze TCFD availability to respond to calls, and the frequency by number of hours that units are dedicated to a single or multiple incidents.

TABLE 4-4: All Call Types and Duration of Calls

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	More Than Two Hours	Total
False alarm	58	30	14	1	103
Good intent	12	9	2	1	24
Hazard	35	24	13	7	79
Outside fire	10	9	6	4	29
Public service	3	3	1	0	7
Structure fire	5	8	3	2	18
Fire total	**123**	**83**	**39**	**15**	**260**
EMS total	5	2	2	0	9
Canceled	86	15	8	1	110
Mutual aid	2	5	4	2	13
Total	**217**	**105**	**52**	**18**	**392**

TABLE 4-5: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
2/14/2019, 6:00 p.m. to 7:00 p.m.	3	9	1.8
7/11/2019, 6:00 p.m. to 7:00 p.m.	2	17	16.5
8/4/2019, 9:00 p.m. to 10:00 p.m.	2	11	6.4
9/25/2019, 6:00 p.m. to 7:00 p.m.	2	7	4.1
4/19/2019, 5:00 p.m. to 6:00 p.m.	2	7	2.4
6/15/2019, 4:00 p.m. to 5:00 p.m.	2	7	2.4
2/17/2019, 10:00 a.m. to 11:00 a.m.	2	6	4.0
1/1/2019, 1:00 a.m. to 2:00 a.m.	2	5	5.2
10/26/2019, 7:00 p.m. to 8:00 p.m.	2	5	1.9
5/1/2019, 8:00 p.m. to 9:00 p.m.	2	4	2.7

TABLE 4-6: Run Workload by Station and Unit

Station	Unit	Unit Type	Deployed Minutes per Run	Total Hours	Total Pct.	Deployed Minutes per Day	Total Runs	Runs per Day
1	BR217	Brush	55.4	57.2	7.3	9.4	62	0.2
	BR219	Brush	49.9	10.8	1.4	1.8	13	0.0
	EN214	Engine	56.8	2.8	0.4	0.5	3	0.0
	EN220	Engine	49.8	60.6	7.8	10.0	73	0.2
	EN221	Engine	35.0	152.1	19.5	25.0	261	0.7
	Total		**41.3**	**283.6**	**36.4**	**46.6**	**412**	**1.1**
2	BR215	Brush	25.6	2.1	0.3	0.4	5	0.0
	BR216	Brush	68.0	10.2	1.3	1.7	9	0.0
	BR223	Brush	56.7	42.5	5.5	7.0	45	0.1
	LAD222	Ladder	42.0	31.5	4.0	5.2	45	0.1
	LAD224	Ladder	72.2	15.6	2.0	2.6	13	0.0
	Total		**52.3**	**102.0**	**13.1**	**16.8**	**117**	**0.3**

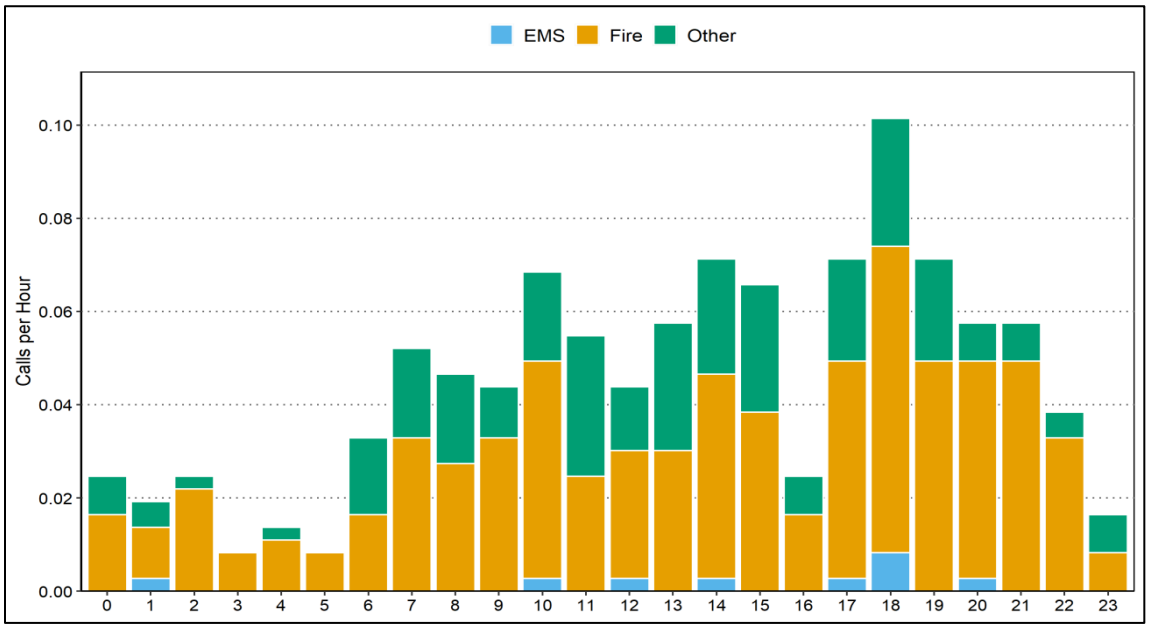
TABLE 4-7: Frequency of Overlapping Calls

Scenario	Number of Calls	Percent of All Calls	Total Hours
No overlapped call	348	97.2	240.4
Overlapped with one call	10	2.8	2.6

TABLE 4-8: Calls by Call Type and Number of Arriving Fire Suppression Units

Call Type	Number of Units				Total Calls
	One	Two	Three	Four or More	
False alarm	69	9	0	1	79
Good intent	13	7	1	1	22
Hazard	46	21	1	0	68
Outside fire	5	12	8	2	27
Public service	2	1	2	0	5
Structure fire	5	3	5	5	18
Fire Total	**140**	**53**	**17**	**9**	**219**
EMS Total	**0**	**5**	**0**	**0**	**5**
Canceled	16	1	1	0	18
Mutual aid	6	2	2	0	10
Total	**162**	**61**	**20**	**9**	**252**
Percentage	**64.3**	**24.2**	**7.9**	**3.6**	**100.0**

FIGURE 4-16: Calls by Hour of Day



Regarding the TCFD's resiliency to respond to calls, analysis of these tables and figure tells us:

- On average the TCFD made 1.4 runs per day from both stations. **A run involves more than one unit, and each unit is counted for the call. A call is a single count**.
- The average deployed time for EMS runs was 42.7 minutes. The average deployed time for fire runs was 46.1 minutes (Table 7-4).
- On a station level, Station 1 made the most runs (412 runs, an average of 1.1 runs per day). Station 1 also had the highest total annual deployed time (284 hours, or an average of 47 minutes per day). Station 1 houses the primary engine companies, which carry the majority of the workload for the TCFD.
- On a unit level, Engine 221 made the most runs (261, or an average of just under one run per day) and had the highest total annual deployed time (152 hours, or an average of 25 minutes per day).
- 97 percent of the time the TCFD was deployed on a call, there was no call overlap.
- 3 percent of the time the TCFD was deployed on a call, another call occurred.
- For 64 percent of the calls received, the TCFD only responded one unit.
- For 24 percent of the calls received, the TCFD responded two units to a call for service.
- Hourly deployed time was highest during the day from 6:00 p.m. to 7:00 p.m.
- Peak call time for the TCFD varies. Calls are more likely to occur, however, between 7:00 a.m. and 10:00 p.m.

We conclude that, based on the overall workload of the TCFD, that 97 percent of the time there are no overlapping calls for service, that the highest percentage of calls answered last less than 30 minutes, and that 88 percent of the time the TCFD responds two apparatus to a call for service, the TCFD has resiliency in its deployment of resources.

RISK CATEGORIZATION

A comprehensive risk assessment is a critical aspect of creating standards of cover and can assist the TCFD in quantifying the risks that it faces. Once those risks are known, the department is better equipped to determine if the current response resources are sufficiently staffed, equipped, trained, and positioned. In this component, the factors that drive the service needs are examined and then link directly to discussions regarding the assembling of an effective response force (ERF) and when contemplating the response capabilities needed to adequately address the existing risks, which encompasses the component of critical tasking. Both of these elements are discussed later in the report.

Risk is often categorized in three ways: the probability the event will occur in the community, consequence of the event on the community, and the impact on the fire department. The following three tables look at the probability of the event occurring (Table 4-9) which ranges from unlikely to frequent; consequence to the community (Table 4-10), which is categorized as ranging from insignificant to catastrophic; and the impact on the organization (Table 4-11), which ranges from insignificant to catastrophic.

TABLE 4-9: Event Probability

Probability	Chance of Occurrence	Description	Risk Score
Unlikely	2%-25%	■ Event may occur only in exceptional circumstances.	**2**
Possible	26%-50%	■ Event could occur at some time and/or no recorded incidents. Little opportunity, reason, or means to occur.	**4**
Probable	51%-75%	■ Event should occur at some time and/or few, infrequent, random recorded incidents, or little anecdotal evidence. Some opportunity, reason, or means to occur; may occur.	**6**
Highly Probable	76%-90%	■ Event will probably occur and/or regular recorded incidents and strong anecdotal evidence. Considerable opportunity, means, reason to occur.	**8**
Frequent	90%-100%	■ Event is expected to occur. High level of recorded incidents and/or very strong anecdotal evidence.	**10**

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TABLE 4-10: Consequence to Community Matrix

Impact	Impact Categories	Description	Risk Score
Insignificant	Life Safety	■ 1 or 2 people affected, minor injuries, minor property damage, and no environmental impact.	**2**
Minor	Life Safety Economic and Infrastructure Environmental	■ Small number of people affected, no fatalities, and small number of minor injuries with first aid treatment. Minor displacement of people for <6 hours and minor personal support required. ■ Minor localized disruption to community services or infrastructure for <6 hours. Minor impact on environment with no lasting effects.	**4**
Moderate	Life Safety Economic and Infrastructure Environmental	■ Limited number of people affected (11 to 25), no fatalities, but some hospitalization and medical treatment required. Localized displacement of small number of people for 6 to 24 hours. Personal support satisfied through local arrangements. Localized damage is rectified by routine arrangements. ■ Normal community functioning with some inconvenience. ■ Some impact on environment with short-term effects or small impact on environment with long-term effects.	**6**
Significant	Life Safety Economic and Infrastructure Environmental	■ Substantial number of people (>25) in affected area impacted with multiple fatalities, multiple serious or extensive injuries, and significant hospitalization. ■ Enormous number of people displaced for 6 to 24 hours or possibly beyond. External resources required for personal support. Grave damage that requires external resources. Community only partially functioning, some services unavailable. ■ Significant impact on environment with medium- to long-term effects.	**8**
Catastrophic	Life Safety Economic and Infrastructure Environmental	■ Very large number of people in affected area(s) impacted with significant numbers of fatalities, large number of people requiring hospitalization; serious injuries with long-term effects. General and widespread displacement for prolonged duration; extensive personal support required. Extensive damage to properties in affected area requiring major demolition.	**10**

Impact	Impact Categories	Description	Risk Score
		■ Serious damage to infrastructure. Significant disruption to, or loss of, key services for prolonged period. ■ Community unable to function without significant support. ■ Significant long-term impact on environment and/or permanent damage.	

TABLE 4-11: Impact on TCFD

Impact	Impact Categories	Description	Risk Score
Insignificant	Personnel and Resources	■ One apparatus out of service for period not to exceed one hour.	**2**
Minor	Personnel and Resources	■ More than one but not more than two apparatus out of service for a period not to exceed one hour.	**4**
Moderate	Personnel and Resources	■ More than 50 percent of available resources committed to incident for over 30 minutes.	**6**
Significant	Personnel and Resources	■ More than 75 percent of available resources committed to an incident for over 30 minutes.	**8**
Catastrophic	Personnel, Resources, and Facilities	■ More than 90 percent of available resources committed to incident for more than two hours or event which limits the ability of resources to respond.	**10**

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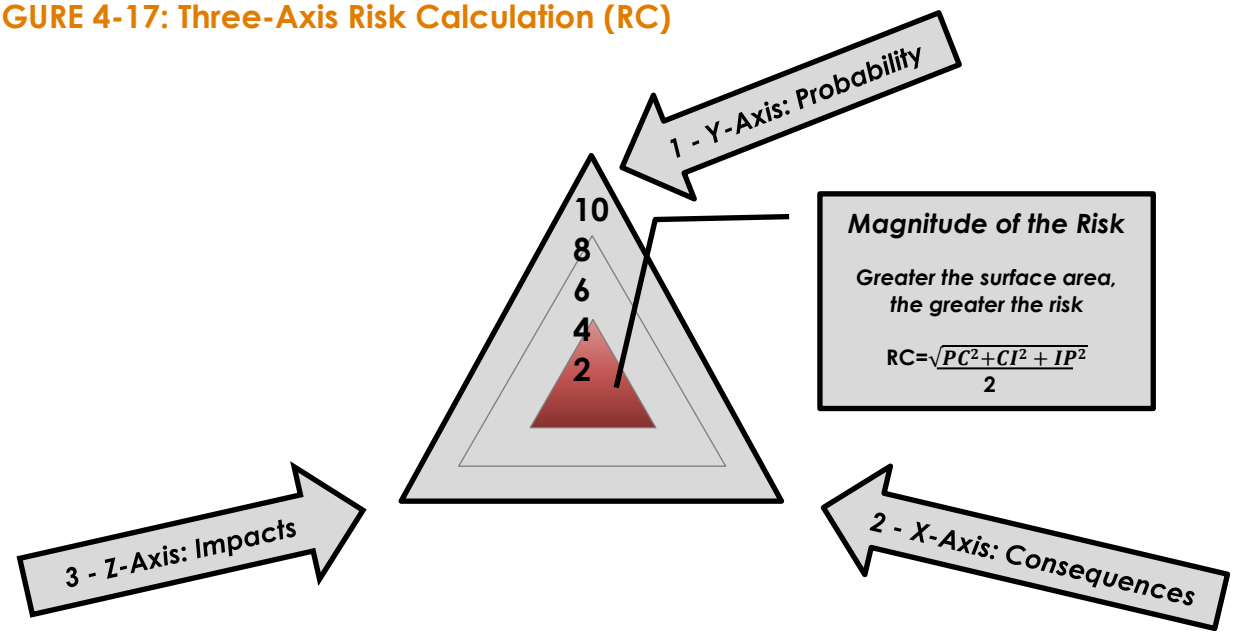
This section also contains an analysis of the various risks considered in the city. In this analysis, information presented and reviewed in this section have been considered. Risk is categorized as Low, Moderate, High, or Special.

Prior risk analysis has only attempted to evaluate two factors of risk: probability and consequence. Contemporary risk analysis considers the impact of each risk to the organization, thus creating a three-axis approach to evaluating risk as depicted in the following figure. A contemporary risk analysis now includes probability, consequences to the community, and impact on the organization, in this case the TCFD.

FIGURE 4-17: Three-Axis Risk Calculation (RC)



The following factors/hazards were identified and considered:

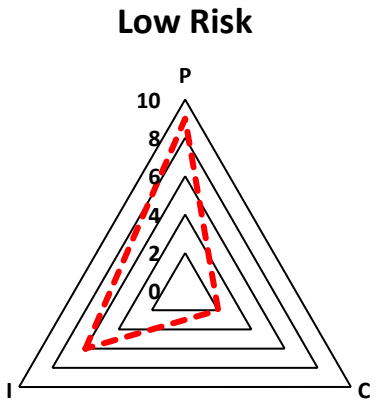
- **Demographic factors** such as age, socio-economic, vulnerability.
- **Natural hazards** such as flooding, snow and ice events, wind events, wild land fires.
- **Manufactured hazards** such as rail lines, roads and intersections, target hazards.
- **Structural/building risks**.
- **Fire and EMS incident responses and demand density**.

The assessment of each factor and hazard as listed below took into consideration the likelihood of the event, the impact on the city itself, and the impact on TCFD's ability to deliver emergency services, which includes time of day, department resiliency, and mutual aid capabilities as well. The list is not all inclusive but includes categories most common or that may present to the city and the TCFD.

Low Risk

- Automatic fire/false alarms.
- Low-risk environmental event.
- Motor vehicle accident (MVA) with small spill and low hazards.
- Good intent/hazard/public service fire incidents with no life-safety exposure.
- Outside fires such as grass, rubbish, dumpster, vehicle with no structural/life-safety exposure.

FIGURE 4-18: Low Risk



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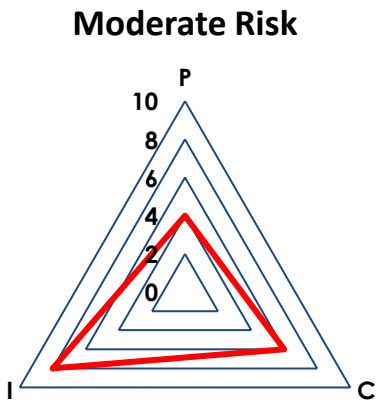
Moderate Risk

- Fire incident in a single-family dwelling where fire and smoke or smoke is visible, indicating a working fire.
- Suspicious substance investigation involving multiple fire companies and law enforcement agencies.
- MVA with entrapment of passengers.
- Grass/brush fire with structural endangerment/exposure.
- Low angle rescue involving ropes and rope rescue equipment and resources.
- Surface water rescue.
- Good intent/hazard/public service fire incidents with life-safety exposure.
- Rail event with no release of product or fire, and no threat to life safety.

FIGURE 4-19: Moderate Risk



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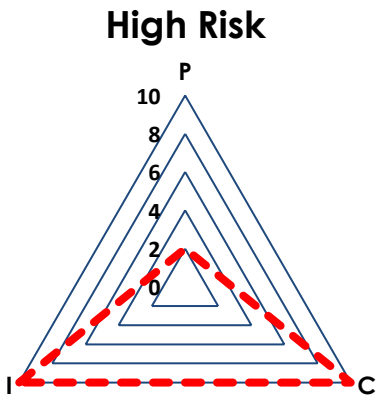
High Risk

- Working fire in a target hazard.
- Wild Land-Urban Interface fire with structural involvement.
- Mass casualty incident of more than 10 patients but fewer than 25 patients.
- Confined space rescue.
- Structural collapse involving life-safety exposure.
- High-angle rescue involving ropes and rope rescue equipment.
- Trench rescue.
- Suspicious substance incident with multiple injuries.
- Industrial leak of hazardous materials that causes exposure to persons or threatens life safety.
- Weather event that creates widespread flooding, heavy snow, heavy winds, building damage, and/or life-safety exposure.

FIGURE 4-20: High Risk



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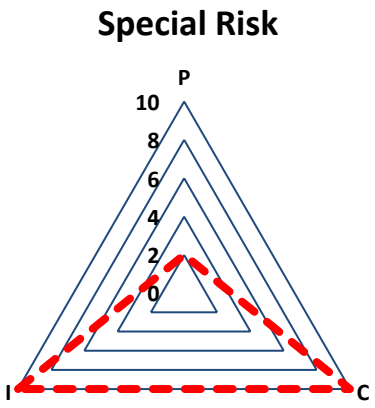
Special Risk

- Working fire in a structure of more than three floors.
- Fire at an industrial building or complex with hazardous materials.
- Fire in an occupied targeted hazard with special life-safety risks such as age, medical condition, or other identified vulnerabilities.
- Mass casualty incident of more than 25 patients.
- Rail or transportation incident that causes life-safety exposure or threatens life safety through the release of hazardous smoke or materials and evacuation of residential and business occupancies.
- Explosion in a building that causes exposure to persons or threatens life safety or outside of a building that creates exposure to occupied buildings or threatens life safety.
- Massive flooding, fire in a correctional or medical institution, high-impact environmental event, pandemic.
- Mass gathering with threat of fire and threat to life safety or other civil unrest, weapons of mass destruction release.

FIGURE 4-21: Special Risk



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SECTION 5. EMERGENCY DEPLOYMENT AND PERFORMANCE

FIRE OPERATIONS OVERVIEW

Fire and technical rescue incidents, and the fire department's ability to respond to, manage, and mitigate them effectively, efficiently, and safely, are mission-critical components of the emergency services delivery system. In fact, fire, and rescue, and in many fire departments its EMS operations, provide the primary, and certainly most important, basis for the very existence of the fire department.

Nationwide, fire departments are responding to more non-fire calls, and fewer calls that result in active firefighting operations by responders. This is well documented in both national statistical data as well as in CPSM fire studies. Nationally, improved building construction, code enforcement, automatic sprinkler systems, and aggressive public education programs have contributed to a decrease in serious fires and, more importantly, fire deaths among civilians.

These trends and improvements in the overall fire protection system notwithstanding, fires still do occur, and the largest percentage of those occur in residential occupancies, where they place the civilian population at risk. Although they occur with less frequency than they did several decades ago, when they occur today, they grow much quicker and burn more intensely than they did in the past due to building construction features, more flammable interior finishes and furniture, and in some cases in older buildings with multiple renovations that have led to hidden voids and spaces that act as channels for fire and smoke. As will be discussed later in this section, ***it is imperative that the fire department, even a volunteer fire department, is able to assemble an Effective Response Force (ERF) within a reasonable time period in order to successfully mitigate these incidents with the least amount of loss possible and with a focus on life and firefighter safety.***

Fire and rescue work are task-oriented and labor intensive, performed by personnel wearing heavy, bulky personal protective equipment (PPE). Many critical fireground tasks require the skillful operation and maneuvering of heavy equipment.

The speed, efficiency, and safety of fireground operations are dependent upon the number of firefighters performing the tasks. If fewer firefighters are available to complete critical fireground tasks, those tasks will require more time to complete. This increased time is associated with elevated risk to both firefighters and civilians who may still be trapped in a structure.

To ensure civilian and firefighter safety, fireground tasks must be coordinated and performed in rapid sequence. Assembling an Effective Response Force (ERF) is essential to accomplish on-scene goals and objectives safely and efficiently. Without adequate resources to control the fire, the structure and its contents continue to burn. This increases the likelihood of a sudden change in fire conditions, and thus the potential for failure of structural components leading to collapse. An inadequate ERF limits firefighters' ability to successfully perform a search and potential rescue of any occupants.

As a fire grows and leaves the room and then floor of origin, or extends beyond the building of origin, it is most probable that additional personnel and equipment will be needed, as initial response personnel will be taxed beyond their available resources. From this perspective it is critical that the TCFD and mutual aid units respond quickly and initiate extinguishment efforts as

rapidly as possible after notification of an incident. It is, however, difficult to determine in every case the effectiveness of the initial response in limiting the fire spread and fire damage. Many variables will impact these outcomes, including:

- The time of detection, notification, and response of fire units.
- The age and type of construction of the structure.
- The presence of any built-in protection (automatic fire sprinklers) or fire detection systems.
- The contents stored in the structure and its flammability.
- The presence of any flammable liquids, explosives, or compressed gas canisters.
- Weather conditions and the availability of water for extinguishment.

Subsequently, in those situations in which there are extended delays in the extinguishment effort, or the fire has progressed sufficiently upon arrival of fire units, there is actually very little that can be done to limit the extent of damage to the entire structure and its contents. In these situations, suppression efforts may need to focus on the protection of nearby or adjacent structures (exterior exposures) with the goal being to limit the spread of the fire beyond the building of origin, and sometimes the exposed building. This is often termed ***protecting exposures***. When the scope of damage is extensive, and the building becomes unstable, firefighting tactics typically move to what is called a ***defensive attack***, or one in which hose lines and more importantly personnel are on the outside of the structure and their focus is to merely discharge large volumes of water until the fire goes out. In these situations, the ability to enter the building is extremely limited and if victims are trapped in the structure, there are very few safe options for making entry.

Today's fire service is actively debating the options of interior firefighting vs. exterior firefighting. These terms are self-descriptive in that an ***interior fire attack*** is one in which firefighters enter a burning building in an attempt to find the seat of the fire and from this interior position extinguish the fire with limited amounts of water. An ***exterior fire attack***, also sometimes referred to as a ***transitional attack***, is a tactic in which firefighters initially discharge water from the exterior of the building, either through a window or door and knock down the fire before entry in the building is made. The concept is to introduce larger volumes of water initially from the outside of the building, cool the interior temperatures, and reduce the intensity of the fire before firefighters enter the building.

A transitional attack is most applicable in smaller structures, typically single-family, one-story detached units that are smaller than 2,500 square feet in total floor area. For fires in larger structures, the defensive-type, exterior attacks involve the use of master streams, typically from an elevated aerial device, and capable of delivering large volumes of water for an extended period of time.

The exterior attack limits the firefighter from making entry into those super-heated structures that may be susceptible to collapse. From CPSM's perspective, there is the probability, dependent on the time of day, a TCFD response crew of a limited number of personnel on the initial response will encounter a significant and rapidly developing fire situation. ***It is prudent, therefore, that TCFD build at least a component of its training and operating procedures around the tactical concept of this occurring.***

Critical tasks are those activities that must be conducted in a timely manner by responders at emergency incidents to control the situation and stop loss. Critical tasking for fire operations is

the minimum number of personnel needed to perform the tasks required to effectively control and mitigate a fire or other emergency.

To be effective, critical tasking must assign enough personnel so that all identified functions can be performed simultaneously. However, it is important to note that initial response personnel may handle secondary support functions once they have completed their primary assignment. Thus, while an incident may end up requiring a greater commitment of resources or a specialized response, a properly executed critical tasking assignment will provide adequate resources to immediately begin bringing the incident under control.

NFPA 1720

National Fire Protection Association (NFPA) standards are consensus standards and not the law. Many cities and counties strive to achieve these standards to the extent possible without placing an undue financial burden on the community. A local jurisdiction must decide on the level of service it can deliver based on several factors as discussed herein to include budgetary considerations. Questions of legal responsibilities are often discussed in terms of compliance with NFPA standards. Again, these are national consensus standards, representing best practices and applied science and research.

NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments*, 2020 edition (National Fire Protection Association, Quincy, Mass.), outlines organization and deployment of operations by volunteer and combination (a fire department having emergency service personnel comprising less than 85 percent majority of either volunteer or career membership) fire and rescue organizations.[26] It serves as a benchmark to measure staffing and deployment of resources to certain fire incidents and emergencies.

According to NFPA 1720, fire departments should base their specific role on a formal community risk management plan, as discussed earlier in this analysis, and taking into consideration:[27]

- Life hazard to the population protected. The number and type of units assigned to respond to a reported incident shall be determined by risk analysis and/or pre-fire planning.
- Fire suppression operations shall be organized to ensure that the fire department's fire suppression capability includes personnel, equipment, and other resources to deploy fire suppression resources in such a manner that the needs of the organization are met.
- The Authority Having Jurisdiction shall promulgate the fire department's organizational, operational, and deployment procedures by issuing written administrative regulations, standard operating procedures, and departmental orders.
- The number of members that are available to operate on an incident is sufficient and able to meet the needs of the department.
- Provisions for safe and effective firefighting performance conditions for the firefighters.
- Personnel responding to fires and other emergencies shall be organized into company units or response teams and have the required apparatus and equipment to respond.

26. NFPA 1720 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of Utah. It is a valuable resource for establishing and measuring performance objectives for Tooele City but should not be the only determining factor when making local decisions about the county's fire and EMS services.
27. NFPA 1710, 5.2.1.1, 5.2.2.2

- Initial firefighting operations shall be organized to ensure that at least four members are assembled before interior fire suppression operations are initiated in a hazardous area.
- The capability to sustain operations shall include the personnel, equipment, and resources to conduct incident specific operations.

It is understood that volunteers typically respond to incidents from home or work, so for a minimum-level Effective Response Force to begin fire suppression efforts, NFPA 1720 establishes the minimum response staffing for a predominately volunteer department for low-hazard structural firefighting incidents (to include out buildings and up to a 2,000 square-foot, one- to two-story, single-family dwelling without a basement and no exposures) for specific demand zones as shown in the following table.

Each demand zone takes into consideration certain risk elements such as population density, exposed occupied buildings (more predominant in urban and suburban demand zones), water supply, and proximity to responding apparatus and members (incident and fire station).

TABLE 5-1: NFPA 1720 Staffing for Effective Response Force, Residential Structure

Demand Zone	Demographics	Minimum Staff to Respond to Scene*	Response Time Standard
Urban Area	>1000 people/mi^2	15	Within 9 minutes 90 percent of the time
Suburban Area	500-1000 people/mi^2	10	Within 10 minutes 80 percent of the time
Rural Area	<500 people/mi^2	6	Within 14 minutes 80 percent of the time
Remote Area	Travel Distance ≥ 8 miles	4	Directly dependent on travel distance, determined by AHJ, 90 percent of the time

Note: *Minimum staff responding includes automatic and mutual aid. Minimum staff responding to scene by apparatus and personal owned vehicle.

The next figure shows the areas of Tooele City that are urban, suburban, and rural as benchmarked against the NFPA 1720 demographics. The purpose of this map is to identify where the NFPA 1720 demand zones exist in the city and how this links to the Effective Response Force for each zone the TCFD should strive to meet for building fires. The largest built-upon land area of the city meets the NFPA 1720 urban demand zone minimum staff to respond benchmark, that is, 15 personnel.

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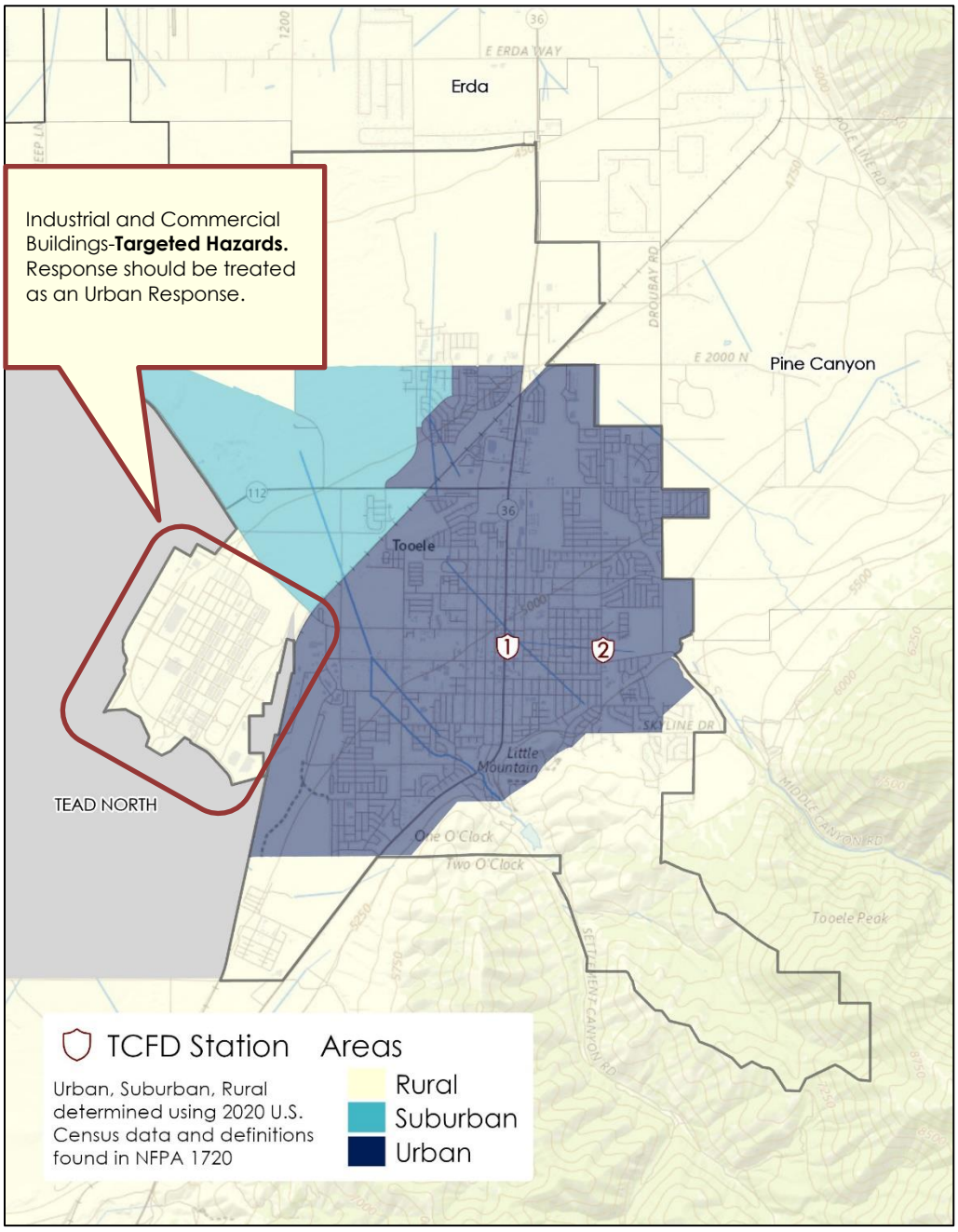
FIGURE 5-1: Tooele City NFPA 1720 Demand Zones



The variables of how and where personnel and companies are located, and how quickly they can arrive on scene, play major roles in controlling and mitigating emergencies. ***The reality is that TCFD relies on volunteer response from home or work to make up the teams and crews of the Effective Response Force.*** TCFD's volunteer availability at any time of the day may have an impact on assembling enough personnel and resources on the scene. This factor has to be considered at all times by those responding to the scene, those responding to the station to pick up apparatus, and command officers responding who must manage and coordinate available responding and on-scene resources.

The next three tables provide examples of operational critical tasking utilizing the NFPA 1720 minimum staffing criteria. As discussed above, the urban demand zone stipulates the largest minimum staffing and more closely aligns with the NFPA 1710 Effective Response Force. In the urban demand zone, when the minimum staffing assembles, critical tasks are completed simultaneously. ***TCFD has urban demand zones in its response district as defined by NFPA 1720.***

In the suburban, rural, and remote demand zones, critical tasks are combined more frequently than in the urban demand zone, creating circumstances where these critical tasks are completed in sequence, rather than simultaneously. ***TCFD has suburban demand zones in its response district as defined in NFPA 1720.***

The rural and remote demand zone minimum staffing can place one attack line in service, and then combine two-person crews (two for rural; one for remote) to handle one or two other critical tasks until additional crew members arrive on scene. Achieving completion of the basic fireground critical tasks as outlined in the suburban demand zone is less than optimal in the rural and remote demand zones. ***The TCFD has rural demand zones in its response district as defined in NFPA 1720.***

TABLE 5-2: Critical Tasking in an Urban Demand Zone, Single-Family Dwelling

Critical Task	# of Responders Assigned to Task
Attack Line (2-In)	2
Backup/Second Line	2
Ventilation	2
Search and Rescue	2
Rapid Intervention (2-out)	2
Attack Engine Pump Operator	1
Water Source Engine Pump Operator	1
Outside Crew for: utility control, hose management, potential exposure line or additional fire suppression line	2
Incident Commander	1
Total Minimum Response for Urban Demand Zone	**15**

TABLE 5-3: Critical Tasking in a Suburban Demand Zone, Single-Family Dwelling

Critical Task	# of Responders Assigned to Task
Attack Line/Search and Rescue (2-In)	2
Backup/Second Line	2
Attack Engine Pump Operator	1
Water Source Engine Pump Operator	1
Outside crew for: rapid intervention crew ventilation, utility control, hose management, potential exposure line or additional fire suppression line	3
Incident Commander	1
Total Minimum Response for Suburban Demand Zone	**10**

TABLE 5-4: Critical Tasking in a Rural Demand Zone, Single-Family Dwelling

Critical Task	# of Responders Assigned to Task
Attack Line/Search and Rescue (2-In)	2
Backup/Second Line	2
Outside crew for: initial engine pump operator (sets pump then assists with outside tasks), ventilation, utility control, hose management, potential exposure line or additional fire suppression line. One member may take on incident command function coordinating with interior crew(s) until additional crew members/command officers arrive on scene.	2
Total Minimum Response for Rural Demand Zone	**6**

NFPA 1500, and Two-In/Two-Out

Another consideration, and one that links to critical tasking and assembling an Effective Response Force, is that of two-in/two-out. Prior to initiating any fire attack in an immediately dangerous to life and health (IDLH) environment (and with no confirmed rescue in progress), the initial two-person entry team shall ensure that there are sufficient resources on-scene to establish a two-person initial rapid intervention team (IRIT) located outside of the building.

One standard that addresses this is NFPA 1500, *Standard on Fire Department Occupational Health, Safety, and Wellness*, 2018 Edition. NFPA 1500 addresses the issue of two-in/two-out by stating during the initial stages of the incident where only one crew is operating in the hazardous area of a working structural fire. By this standard, a minimum of four individuals shall be required consisting of two members working as a crew in the hazardous area and two standby members present outside this hazard area available for assistance or rescue at emergency operations where entry into the danger area is required.[28]

NFPA 1500 also speaks to the utilization of the two-out personnel in the context of the health and safety of the firefighters working at the incident. *The assignment of any personnel including the incident commander, the safety officer, or operations of fire apparatus, shall not be permitted as standby personnel if by abandoning their critical task(s) to assist, or if necessary, perform rescue, the clearly jeopardize the safety and health of any firefighter working at the incident.*[29]

As is common with many volunteer/combination fire departments, TCFD does not respond to structural fires with a pre-determined staffing regimen or a guaranteed command officer on the initial alarm dispatch. Under this response model, TCFD may or may not have the minimum number of firefighters on the initial response in order to comply with CFR 1910.134(g)(4), regarding two-in/two-out rules and initial rapid intervention team (IRIT). Responding members must by mindful of who and what apparatus is on scene and the Two-In/Two-Out concept.

In order to meet the intent of NFPA 1500, TCFD must utilize two personnel to commit to interior fire attack while two firefighters remain out of the hazardous area or immediately dangerous to life

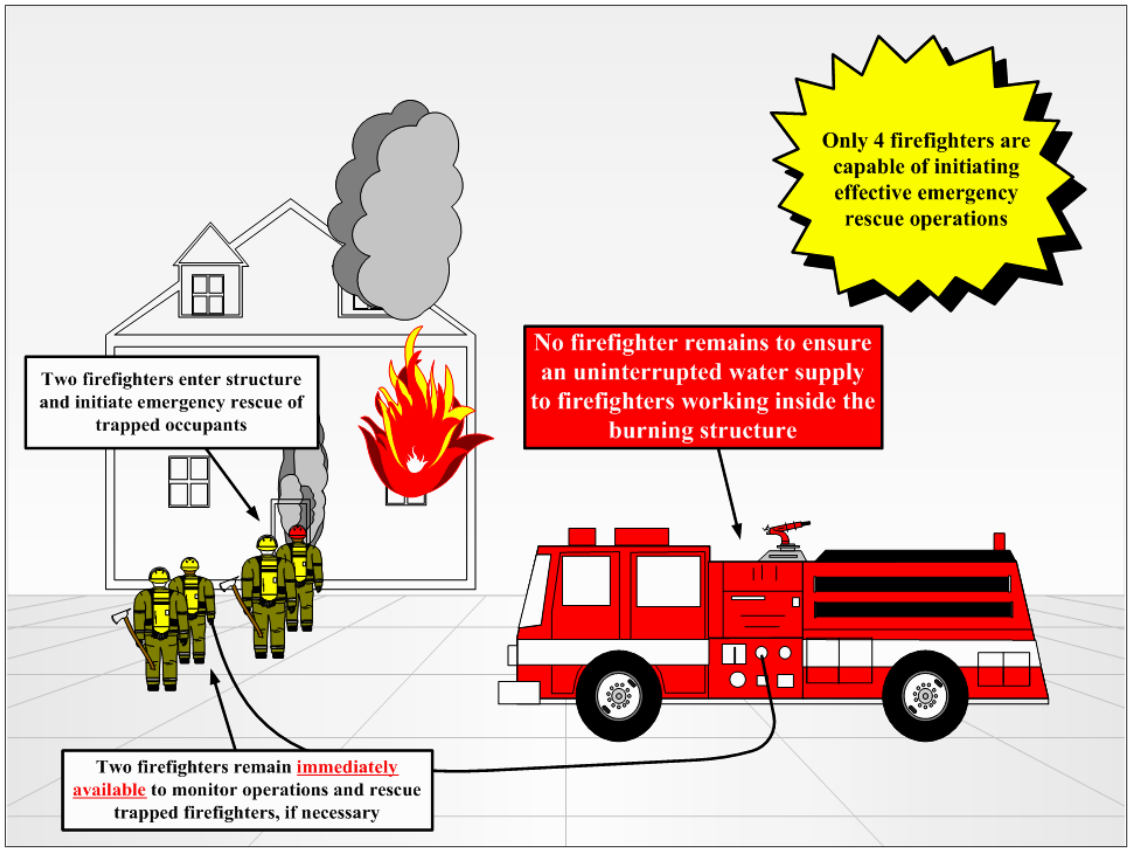
28. NFPA 1500, 2018, 8.8.2.
29. NFPA 1500, 2018, 8.8.2.5.

and health (IDLH) area to form the IRIT, while attack lines are charged, and a continuous water supply is established.

NFPA 1500 does allow for fewer than four personnel under specific circumstances. It states, Initial attack operations shall be organized to ensure that if on arrival at the emergency scene, initial attack personnel find an imminent life-threatening situation where immediate action could prevent the loss of life or serious injury, such action shall be permitted with fewer than four personnel.[30]

In the end, the ability to assemble adequate personnel, along with appropriate apparatus to the scene of a structure fire, is critical to operational success and firefighter safety. NFPA 1720 addresses this through the minimum staff to respond matrix this standard promulgates.

FIGURE 5-2: Two-In/Two-Out Interior Firefighting Model*



Note: *Four-person staffing, with single engine arrive at scene, or
Two 2-person staffed units (engine/engine; engine/ambulance) arrive at scene.

30. NFPA 1500, 2018 8.8.2.10.

TCFD Response Times

Response times for fire incidents are based on the concept of "flashover." A **flashover** is the near-simultaneous ignition of most of the directly exposed combustible material in an enclosed area. When certain organic materials are heated, they undergo thermal decomposition and release of flammable gases. Flashover occurs when the majority of the exposed surfaces in a space are heated to their auto ignition temperature and emit flammable gases. "Flashover is the transition phase in the development of a contained fire in which surfaces exposed to thermal radiation, from fire gases in excess of 600 degrees Celsius, reach ignition temperature more or less simultaneously and fire spreads rapidly throughput the space."[31]

Flashover is not time-dependent. Flashover can occur within three minutes from ignition; it may also take longer. Flashover times are more dependent on the size of the compartment, the fuel load within the compartment, and the construction elements of the compartment. Again, these variables cannot be seen from outside the structure, so the interior firefighters and officers must be constantly aware of them.[32]

When the fire does reach this extremely hazardous state, initial firefighting forces are often overwhelmed, a larger and more destructive fire occurs, the fire escapes the room and even the building of origin, and significantly more resources are required to affect fire control and extinguishment.

To illustrate how a fire grows over a brief period of time, the next figure shows the time progression of a fire from inception (event initiation) through flashover. The time-versus-products of combustion curve shows activation times and effectiveness of residential sprinklers (approximately one minute), commercial sprinklers (four minutes), flashover (eight to ten minutes), and firefighters applying first water to the fire after notification, dispatch, response, and set-up (ten minutes).

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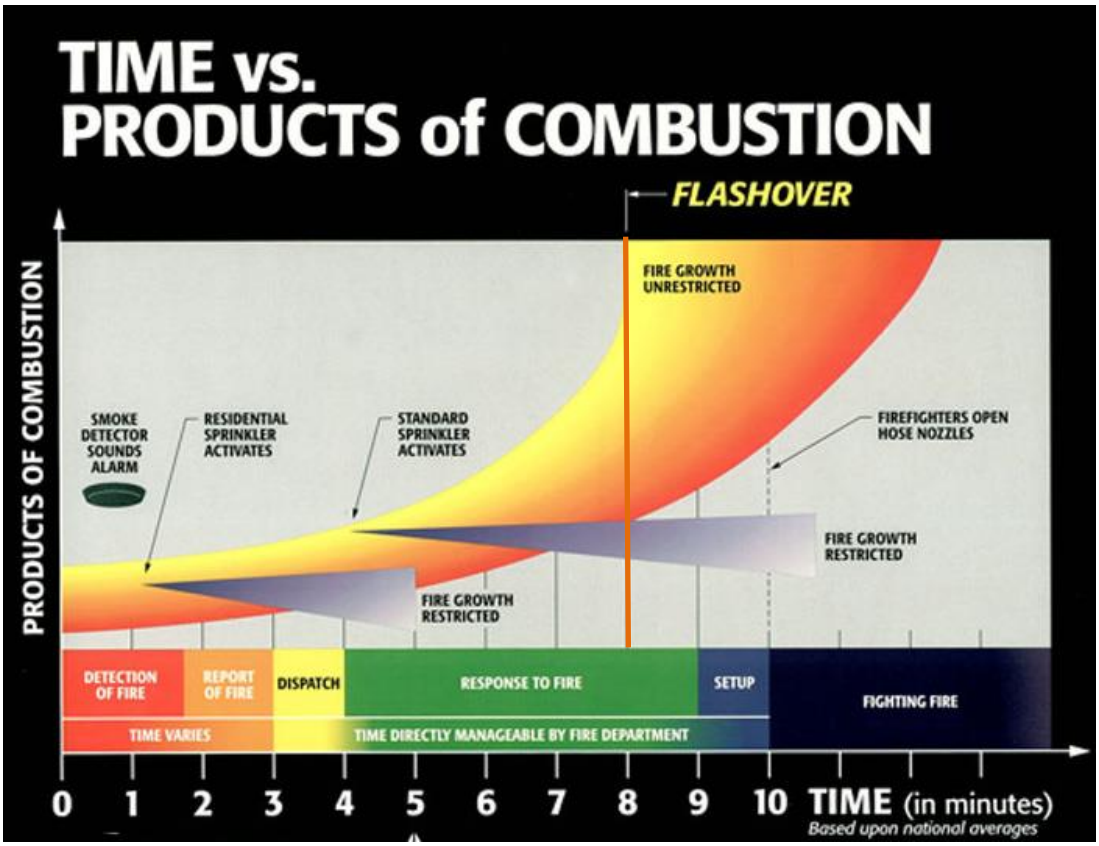
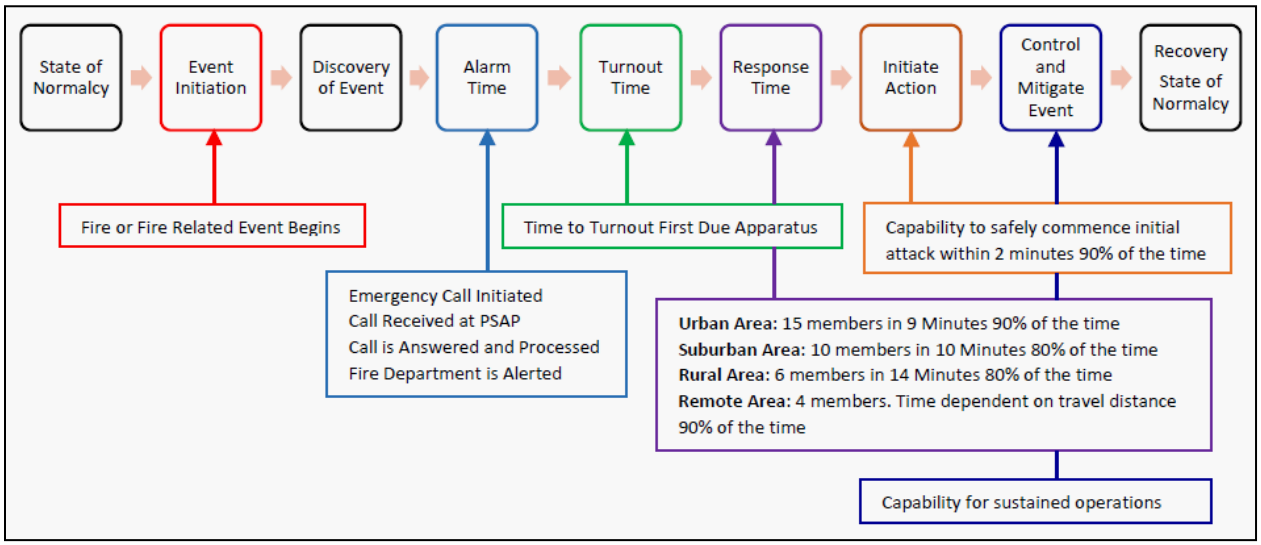
[31] National Institute of Standards and Technology, Definition of Flashover.
[32] Fire Engineering, June 2010, "Understanding Flashover."

FIGURE 5-3: Fire Growth from Inception to Flashover[33]



The next figure illustrates the overview of response time performance for fire response under NFPA 1720.

FIGURE 5-4: NFPA 1720 Response Time Performance Elements



33. Source: Home Fire Sprinkler Coalition.

The next table illustrates TCFD's response times in 2019 for fire incident types at the 80th and 90th percentile in terms of response with the first arriving apparatus to any urban, suburban, or rural area.

Dispatch time is the difference between the time a call is received and the earliest time an agency is dispatched. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch.

Turnout time is the difference between the earliest dispatch time and the earliest time an agency's unit is en route to a call's location.

Travel time is the difference between the earliest en route time and the earliest arrival time.

Response time is the total time elapsed between receiving a call to arriving on scene. In the data analysis, we included all calls within the primary service areas of TCFD to which at least one unit responded.

Canceled and mutual aid calls were excluded. In addition, calls with a total response time of more than 30 minutes or missing response time information were excluded.

TABLE 5-5: 80th and 90th Percentile Response Time of First Arriving Unit

Call Type	80th Percentile Response Time, Min.				90th Percentile Response Time, Min.				Number of Calls
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
False alarm	3.3	5.4	7.2	13.1	4.6	6.1	8.3	16.2	64
Good intent	2.9	4.9	4.7	11.1	4.0	5.6	5.5	15.8	17
Hazard	3.3	3.9	4.6	11.5	4.3	4.9	6.2	14.8	45
Outside fire	2.6	2.8	5.3	11.3	3.4	4.0	8.1	12.9	17
Public service	3.6	4.0	8.4	14.8	3.8	4.3	9.6	15.2	6
Structure fire	3.0	4.2	4.4	10.5	3.3	5.0	6.8	11.3	9
Fire Total	**3.3**	**4.3**	**5.8**	**12.1**	**4.0**	**5.5**	**7.3**	**15.2**	**158**
EMS Total	**6.7**	**2.4**	**3.0**	**12.2**	**6.7**	**2.4**	**3.0**	**12.2**	**3**
Total	**3.3**	**4.3**	**5.8**	**12.1**	**4.0**	**5.5**	**7.3**	**15.2**	**161**

This table tells us:

- The 80th percentile dispatch time was 3.3 minutes
- The 80th percentile turnout time for fire calls was 4.3 minutes.
- The 80th percentile travel time for fire calls was 5.8 minutes.
  - The 80th percentile turnout plus travel time for fire calls was 10 minutes.
- The 80th percentile total response time for fire calls was 12 minutes.
- The 80th percentile response time was 11.3 minutes for outside fires and 10.5 minutes for structure fires.
  - The 80th percentile turnout plus travel time for outside fires was 8.1 minutes and for structure fires was 8.6 minutes.
- The 90th percentile dispatch time for fire calls was 4.0 minutes

- The 90th percentile turnout time for fire calls was 5.5 minutes.
- The 90th percentile travel time for fire calls was 7.3 minutes.
  - The 90th percentile for turnout plus travel time was 12.8 minutes.
- The 90th percentile total response time for fire calls was 15.2 minutes.
- The 90th percentile response time was 12.9 minutes for outside fires and 11.3 minutes for structure fires.
  - The 90th percentile turnout plus travel time for outside fires was 12.1 minutes and for structure fires was 11.8 minutes.

Response times are directly related to fire station location(s) in the community, road conditions, the road network, and the staffing model utilized by fire departments.

TCFD STAFFING MODEL

The TCFD does not have a standardized staffing model for apparatus, meaning an apparatus does not respond with a minimum number of qualified members. When the TCFD is toned out for an incident members respond to the scene and/or to a station to staff and respond the appropriate apparatus. The TCFD has an SOG (Responding in Privately Owned Vehicles) that states *if responding firefighters pass by a fire station, they are responsible to stop and pick up a fire engine or ladder truck. It is not acceptable to pass a station and not pick up a fire engine or ladder truck unless other circumstances prohibit it.*

During stakeholder meetings with TCFD staff, it was stressed by the members that the current response system works well, which is some members responding to the scene and some members responding to the station. When prompted by CPSM, stakeholders also communicated that when apparatus rolls on an incident response, the typical staffing is one to two members, sometimes three if a member is visualized as walking in to or pulling up to the station prior to the apparatus leaving the station. TCFD members also communicated that the apparatus driver typically waits one to two minutes for other members responding to the station prior to responding. It was communicated as well that sometimes apparatus responds with driver only.

The next figure illustrates how the response system functions with current members marked on a map of the city in relationship to fire station locations, to include the proposed new Station 3.

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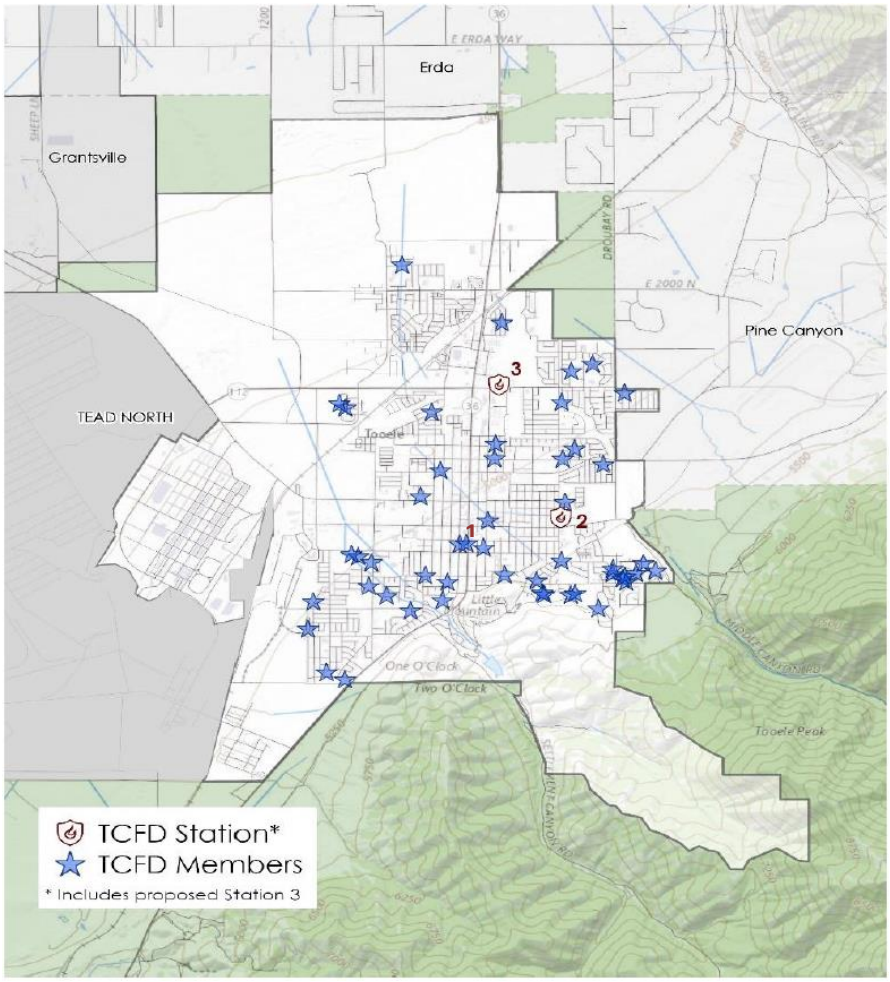
FIGURE 5-5: Location of Current TCFD Members with Fire Stations



There are several factors in any volunteer fire department staffing and deployment model, or for that matter, any fire department career of volunteer that must be considered to ensure effective use of resources and the safety of the public and firefighters. These include:

- Accountability of responding and on-scene resources, and in the case of firefighters responding in personal vehicles, their ability to arrive safe and function safely prior to the initial arriving fire apparatus. In the case of responding apparatus with a single driver, the ability to arrive and position the apparatus (forward and reverse) effectively and safely.
- Meeting the intent of NFPA 1720 standards, in particular ensuring personnel responding to fires and other emergencies are organized into company units or response teams consisting of a team of at least two.
- The avoidance of freelancing on the fireground, particularly early arriving volunteer firefighters to an incident in personal vehicles.
- Organizing initial firefighting operations, ensuring that at least four members are assembled before interior fire suppression operations are initiated in a hazardous area.

- It is of the highest importance that firefighters are trained and disciplined not to freelance or enter a hazardous area or building on fire without the proper equipment beyond their issued personal protective clothing if they arrive to an emergency scene prior to responding fire apparatus.
- Ensuring assembled personnel have radio communication with Incident Command at all times so that they may transmit urgent messages, critical task progress, incident updates, their and their team's location, accountability of their actions, and receive from Incident Command and/or other teams operating at the scene urgent messages, updates, critical task progress, other team locations, and receive new assignments.
  - While meeting with TCFD stakeholders CPSM learned that firefighters responding in personal owned vehicles do not have portable radios and cannot communicate with responding command officers or apparatus until communication device resources arrive. When CPSM asked how they communicate incident size-up or urgent messages, stakeholders answered this is done through a responding Tooele City police officer, if on scene, who is equipped with a portable radio.

TCFD utilizes Active911, a software app that links responding apparatus and responding volunteers to the CAD system, which alerts responding members, apparatus, and command officers who and what apparatus are responding to an incident or the station to respond with apparatus. The features of this software include:

- Members can receive call notifications through the communications system (CAD) to their smartphone.
- When a member utilizes the response functions, the member can alert command officers and apparatus driver/operators they are responding to the scene or the station. Active911 is linked to the apparatus mobile data computer.
- The Active911 App provides a map display of the incident location, directions to the scene, and the live location of responding members and apparatus (as long as members and apparatus are using the system). Through this system, command officers have an initial accountability of responding members and where they are responding to (scene or station).
- When members are responding to the station their live locations are displayed, which alerts command officers and apparatus driver/operators where they are, assisting driver/operators in determining whether to wait on a member prior to rolling apparatus.

NFPA 1720 calls attention to additional staffing/response requirements worth noting here:

- *The fire department shall identify minimum staffing requirements to ensure that the number of members that are available to operate are able to meet the needs of the department.*
  - For the volunteer component this can include scheduled staffing at predetermined stations or pre-determined staff responding to stations to assemble and response apparatus.
- *Where staffed stations are provided, when determined by the authority having jurisdiction, they shall have a turnout time of 90 seconds for fire and special operations and 60 seconds for EMS incidents, 90 percent of the time.*
  - This should be measured at staffed stations.

- *Upon assembling the necessary resources at the emergency scene, the fire department shall have the capability to safety commence an initial attack within 2 minutes 90 percent of the time.*
  - This should be announced by the incident commander over the radio and measured through the computer-aided dispatch (CAD) system after the arrival of the initial arriving members, companies, and response teams.
- *Personnel responding to fires and other emergencies shall be organized into company units or response teams and have the required apparatus and equipment.*
  - This avoids freelancing by personnel before and after the arrival of the fire suppression units; enables the incident commander to size-up available on-scene resources, ensures fireground accountability, and ensures a coordinated assignment of critical tasks.

CPSM learned during the officers' stakeholder meeting that the TCFD does not consistently deploy an emergency scene accountability system utilizing tracking mechanisms that account for individual members by name and where they are operating (interior, exterior, roof, extrication, hose line, hazard control etc.) and who they are operating with (interior crew, extrication crew, attack hose line crew, search and rescue crew, ventilation crew etc.).

The TCFD does have guidelines that addresses incident scene Personnel Accountability Report or PAR, which occurs at various intervals of an emergency incident, or at critical incident junctures such as a building collapse, flashover, equipment failure, or hose line or fire pump issues. A PAR check is made with crews or groups that have radio contact with Incident Command. Matching names with crews and groups is a critical link to account for every member on the emergency scene at all times.

The 2021 edition of NFPA 1500 standard on *Fire Department Occupational Safety, Health, and Wellness Program* is clear on this critical emergency scene function. Additionally, the 2020 edition of NFPA 1561 *Emergency Services Incident Management System and Command Safety* more specifically addresses emergency scene accountability. These standards include the following language as outlined in the following table.

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TABLE 5-6: Emergency Scene Accountability–NFPA 1500 and NFPA 1561

NFPA 1500	NFPA 1561
8.5.1: The fire department shall establish written standard operating procedures for a personnel accountability system; this is in accordance with NFPA 1561.	**4.6.1:** The ESO shall develop and routinely use a system to maintain accountability for all resources assigned to the incident with special emphasis on the accountability of personnel.
8.5.3: It shall be the responsibility of all members operating at the emergency incident to actively participate in the personnel accountability system.	**4.6.2:** The system shall maintain accountability for the location and status condition of each organizational element at the scene of the incident.
8.5.4: The incident commander shall maintain an awareness of the location and function of all companies or crews at the scene of the incident.	**4.6.3:** The system shall include a specific means to identify and keep track of responders entering and leaving hazardous areas, especially where special protective equipment is required.
8.5.8: Members shall be responsible for following personnel accountability system procedures.	**4.6.5:** Responder accountability shall be maintained and communicated within the incident management system when responders in any configuration are relocated at an incident.
8.5.9: The personnel accountability system shall be used at all incidents.	**4.6.6:** Supervisors shall maintain accountability of resources assigned within the supervisor's geographical or functional area of responsibility.
8.5.10: The fire department shall develop, implement, and utilize the system components required to make the personnel accountability system effective.	**4.6.10:** Responders who arrive at an incident in or on marked apparatus shall be identified by a system that provides an accurate accounting of the responders on each apparatus.
	4.6.11: Responders who arrive at the scene of an incident by other means other than emergency response vehicles shall be identified by a system that accounts for their presence and their assignment at the incident scene.
	4.6.14: The system shall also provide a process for the rapid accounting of all responders at the emergency scene.

Accountability systems include tracking systems where responding apparatus crews or individuals deliver accountability tags to Incident Command for use when command assigns members and companies, and forms crews and groups (interior, roof, hazard control etc.). The Incident Commander places the accountability tags on a board or other tracking instrument that he/she can constantly visualize, move when crews are reassigned, and maintain accountability awareness.

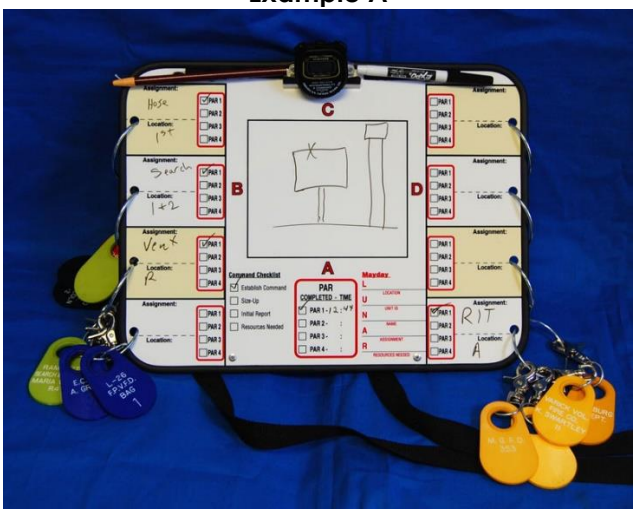
Other accountability systems include tracking mechanisms in self-contained breathing apparatus (SCBA) worn by responders that links back to incident command mobile computer devices that show air supply of individuals utilizing these systems. This system links with the

accountability board identifying individual crew members by apparatus and/or names as assigned to incident locations or tasks. *The TCFD has this feature built into its new SCBA but has not yet implemented the system as it is awaiting software updates.*

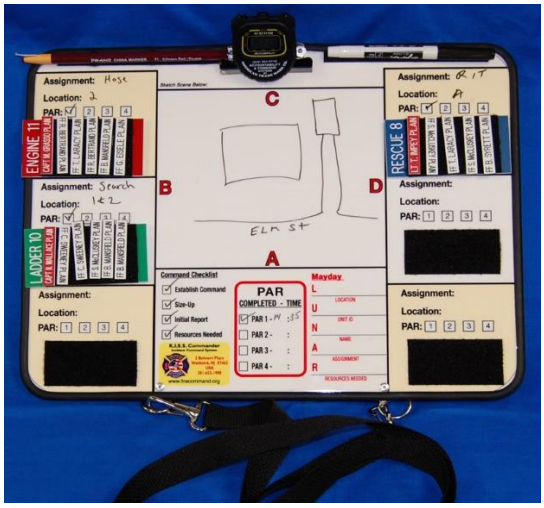
The next figure illustrates accountability boards used by fire department incident commanders.

FIGURE 5-6: Accountability Boards

Example A



Example B



Example A shows a simple system of tags clipped to an accountability board by assignment of task and crew. In this system individual members are issued tags that they clip to their turnout coat. When they are riding on the engine or ladder, they clip an individual tag to the engine or ladder tag. If they respond in their POV, on arrival they would report to command and provide the Incident Commander with their tag. The Incident Commander will then clip either the apparatus tag with individual tags of firefighters arriving on the engine or ladder or of the firefighter arriving via POV in the appropriate assignment area/crew once the engine or ladder crew and individual firefighter is assigned.

Example B is the same system using engraved tags that have Velcro backs. In this system, firefighters are issued accountability tags with their name engraved. They then attach these tags to the underside of their helmets. They place/distribute the tags in the same manner as described in Example A. The firefighter attaches the individual tag to the main apparatus tag or provides it to the Incident Commander when arriving on the scene in their POV.

When developing guidelines for an incident accountability tag system, the TCFD should script how tags are collected prior to the arrival of a command officer, specifically for initial arriving firefighters in POVs prior to apparatus.

There are several methods a volunteer fire department can consider and implement to ensure safe and effective response, while maintaining efficient service to the citizens. Tooele City, with a present population of almost 36,000 and projected substantial growth over the next ten years should begin now to plan for a more contemporary volunteer staffing model before growth and demand overtake the present system. Examples of different volunteer staffing models include:

- Apparatus-only response (minimally staffed apparatus with no or limited personal vehicles to scene response).

- Initial response of members to station, assemble a crew of at least three personnel (Driver/Operator, Officer or designated crew leader, firefighter); apparatus responds. Under this model many volunteer departments establish individual companies by the apparatus they deploy (engines and ladders), assign members and officers who then maintain and staff the apparatus, and then train together to increase their effectiveness on the emergency scene.

- Hybrid response (minimally staffed apparatus and personal vehicle to scene response)
  - For nights and weekends when volunteer members are typically more readily available, assign a crew of three to one engine and one other apparatus (ladder or engine) who respond from home to the station to assemble and respond the apparatus. All other members respond to the scene. Typical crew assignment commitment times are 6:00 p.m. to 6:00 a.m.
- Hybrid response with in-station crews when Station 3 is built.
  - For nights and weekends when volunteer members are able to commit, assign a crew of three to one engine to immediately respond the engine apparatus. Assign a crew of three to one ladder or another engine who respond from home to a station to assemble and respond the apparatus. All other members respond to the scene. *CPSM acknowledges the time away from home for this staffing model and recommends if implemented, duty crew members who stay at the station receive a stipend for each night/weekend day they are assigned to station standby*. Typical crew assignment commitment times are 6:00 a.m. to 6:00 p.m. and 6:00 p.m. to 6:00 a.m.
- Daytime Response
  - Members should register through Active911 that they are available and if qualified, that they will respond to the station and deploy the apparatus. This ensures accountability to the overall system of available responding members and how an Effective Response Force can be assembled during those hours when volunteer members are not as readily available.

Recommendations:

- CPSM recommends the TCFD adopt one or more of the response models outlined herein to ensure the most effective and immediate use of response resources and the safety of the public and firefighters. CPSM also recommends the TCFD develop a guideline that outlines the use of the Active911 wireless phone platform and make this system mandatory for all responders who have access to a wireless phone to ensure accountability of all responders. CPSM also recommends the TCFD migrates to a response model where apparatus responds with a minimum of three personnel, namely, a qualified driver/operator, an officer, and a qualified/certified firefighter.
- CPSM recommends the TCFD immediately develop a personnel accountability guideline that incorporates individual and apparatus accountability tags as well as accountability boards in all apparatus and command vehicles. The personnel accountability guideline should incorporate language from NFPA standards 1720, 1500, and 1561.
- CPSM strongly recommends the TCFD develop a communications guideline that establishes no member may operate on the fireground alone, and all members must operate in a crew of at least two, of which one crew member must have a portable radio that is operating on the assigned tactical channel and is contact with the Incident Commander. It is further recommended each TCFD command vehicle have a bank of portable radios in addition to radios assigned to fire apparatus of sufficient numbers and that can be made available to responding volunteer members in POVs to augment this communications guideline.

MUTUAL AID

Tooele City has reciprocal mutual aid agreements with Tooele County and Tooele Army Depot.

The following table outlines these agreements.

TABLE 5-7: Tooele City Mutual Aid Agreements

Entity	Agreement date	Agreement Components
Tooele County	April 1990	Tooele City provides fire services within a 15-mile radius of the city in the unincorporated area for an established fee. Maintain at least two personnel to serve on the county-wide Haz-Mat Team for an established fee.
Tooele Army Depot	November 2021	Reciprocal agreement to provide fire equipment and personnel when requested if equipment and personnel are available.
Tooele County-Wildland	December 2019	Fire Department accepts custody of certain equipment purchased by the county and maintains said equipment and responds to wildland fires as requested.

The next two tables depict mutual aid the TCFD provided and mutual aid TCFD received in 2019

TABLE 5-8: Mutual Aid Provided

Call ID	Date	Receiving Agency	Call Type	Incident City
819027	2019-01-01	RVFD	Structure fire	TC unincorporated
824489	2019-01-25	RVFD	Structure fire	Rush Valley
828012	2019-02-10	NTFD	Outside fire	Pine Canyon
828333	2019-02-12	NTFD	Canceled	Erda
834017	2019-03-09	NTFD	Canceled	Erda
847499	2019-05-01	NTFD	Canceled	Erda
858721	2019-06-13	NTFD	Hazard	Erda
862421	2019-06-28	NTFD	Outside fire	Erda
867304	2019-07-17	SCFD	Outside fire	TC unincorporated
867632	2019-07-18	SCFD	Canceled	TC unincorporated
867787	2019-07-19	NTFD	EMS Assist	Erda
869144	2019-07-25	NTFD	Outside fire	Grantsville
871544	2019-08-03	GCFD	Structure fire	Grantsville
871794	2019-08-04	NTFD	Public service	Pine Canyon
873084	2019-08-10	NTFD	Canceled	Erda
874219	2019-08-15	NTFD	Outside fire	Erda
876325	2019-08-24	NTFD	Canceled	Erda

Call ID	Date	Receiving Agency	Call Type	Incident City
876725	2019-08-26	NTFD	Outside fire	Erda
882080	2019-09-17	TAFD	Canceled	TC unincorporated
883510	2019-09-23	NTFD	Public service	TC unincorporated
897369	2019-11-22	TRFD	Canceled	TC unincorporated

TABLE 5-9: Mutual Aid Received

Call ID	Date	Responding Agency	Call Type
821488	2019-01-11	NTFD	Good intent
821505	2019-01-11	NTFD	Hazard
824396	2019-01-24	TAFD	Structure fire
824424	2019-01-25	TAFD	Structure fire
827162	2019-02-06	TAFD, IBFD	False alarm
828459	2019-02-12	NTFD	Structure fire
830629	2019-02-22	NTFD	Structure fire
832022	2019-02-28	NTFD	Outside fire
836632	2019-03-21	NTFD	Canceled
840426	2019-04-05	TAFD	Outside fire
842229	2019-04-12	NTFD	Good intent
848265	2019-05-04	TAFD	Structure fire
848459	2019-05-05	TAFD	Canceled
850598	2019-05-13	TAFD	Good intent
853286	2019-05-23	TAFD	Hazard
854546	2019-05-28	TAFD	Structure fire
857729	2019-06-10	GCFD, TAFD	Structure fire
858732	2019-06-13	TAFD	False alarm
859236	2019-06-15	NTFD	Good intent
859373	2019-06-16	TAFD	Good intent
863840	2019-07-03	NTFD	Good intent
863863	2019-07-03	NTFD	Outside fire
863954	2019-07-04	TAFD	Good intent
864336	2019-07-05	TAFD	Canceled
865219	2019-07-09	TAFD	Outside fire
868141	2019-07-21	NTFD	Outside fire
869799	2019-07-27	NTFD	Outside fire
870372	2019-07-30	NTFD	Outside fire
870485	2019-07-30	NTFD, NTFD	Outside fire
873371	2019-08-11	TAFD	Outside fire
874808	2019-08-17	TAFD, SCFD, TRFD, RVFD	Outside fire
877386	2019-08-28	NTFD, GCFD	Structure fire
883590	2019-09-24	NTFD	Hazard
890331	2019-10-23	TAFD	Good intent

Call ID	Date	Responding Agency	Call Type
891795	2019-10-30	NTFD	Structure fire
892696	2019-11-03	TAFD	Outside fire
895503	2019-11-15	TAFD	Good intent

As one can see in these tables, the TCFD received more mutual aid than they provided. It is also noted that the TCFD provides and/or receives mutual aid to the following agencies without a formal mutual aid agreement:

- Rush Valley Volunteer Fire Department.
- Stockton Volunteer Fire Department.
- North Tooele Fire District.
- Grantsville City Fire Department.

Recommendation:

- CPSM recommends Tooele City conduct a comprehensive review of all fire protection service agreements. This review should include the development of new agreements with municipal and special district fire departments that the city currently provides or receives mutual aid to and from where a mutual aid agreement does not exist. The new agreements should define service level response outside of a fire department's respective area and reciprocal equipment, or services for these fire protection responses and services the city will provide. CPSM further recommends that each agreement have a sunset date that will trigger review and updating to address changes in fire protection services in Tooele City and those municipalities and special districts the city has an agreement with.

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SECTION 6. CONCLUSION

This analysis contains illustrative and descriptive material, specific operational and administrative findings, and recommendations regarding the delivery of fire protective and community risk reduction services by the Tooele City Fire Department. Included in this analysis are several components that create the foundation of effective fire protection and community risk reduction services to include governance and administrative oversight and accountability; training and education; community risk; laws, policies, and guidelines; infrastructure such as fleet, facilities, and equipment; city allotted funds to operate; and fire department performance and benchmarking against national standards.

During the course of this analysis the CPSM project team met with public officials and officers and members of the TCFD. A site visit was conducted in late January 2022 to obtain a better understanding of the community risk, service demands, and observe the infrastructure the TCFD operates in and with. The project team operated independently at all times to maintain an unbiased approach to the project's content and recommendations.

The project team worked from the scope of work prepared for the city in the initial proposal, which was to conduct an operational and administrative analysis of the city's fire department, analyzing each discrete function of the department and subsequently provide findings and recommendations for improvement. The project team conducted the analysis without any preconceived concepts or bias. This analysis contains a number of findings and recommendations that CPSM believes will achieve greater operating efficiencies and effectiveness of overall fire protective and community risk reduction services in the city.

CPSM found the TCFD to be open and transparent about its operations. Officers and members with whom the project team interacted were passionate about their volunteer service to the community. In fact, CPSM did not encounter a single member who was not passionate about what they do with regards to the TCFD and the community. All TCFD members are to be commended for their volunteer service and their commitment to the citizens of their community.

Although many of the findings of this analysis may be viewed as costly and something other than positive, they should not be considered as such. Rather, they should be viewed as opportunities to make the TCFD stronger, more efficient, and more effective in how it provides fire protective and community risk reduction services in the city. To some degree, officers and members, past and present, may not have been aware of the many NFPA standards, city ordinances, and state statutes that have an impact on leading, managing, and operating in a contemporary fire department, and if aware, may not have effectively articulated how the TCFD benchmarked against these standards and what was needed to achieve compliance.

Whether volunteer or career, fire protective and community risk reduction services operate under national standards, local government ordinances, and state statutes. It is imperative that department leadership understand and stay abreast of these standards and act accordingly to implement processes, guidelines, funding plans, training, and education of their members, and deploy overall organizational management of contemporary fire services concepts.

Firefighter injuries and deaths are devastating to families, fellow responders, local governments, and the community. The National Institute for Occupational Safety and Health (NIOSH) has studied firefighter fatality root causes, and found five key factors, which are commonly referred to as the NIOSH 5:

- Lack of fireground firefighter accountability.

- Lack of fireground communication methods.
- Lack of standard operating procedures related to response and fireground operations.
- Lack of incident management/command.
- Lack of appropriate risk assessment of the incident as whole, the building, the emergency scene, and basic fireground knowledge to understand the risk.

These five fireground factors should be etched in every firefighter's brain. A fire department training regimen, equipment, guidelines, and culture should center on these five factors. A lack of understanding of these five factors leads to sloppy, ineffective, and unsafe fireground operations. ***They should be taken seriously.***

To the credit of the current Mayor and City Council, this body wanted to understand more about how contemporary fire departments operate, and what was needed to ensure the TCFD was operating efficiently and effectively, has the right equipment and infrastructure to provide services to a city of 35,000 residents and growing, and understand more about what was needed to position the TCFD to provide contemporary fire services.

The principal findings of the study that have the most profound effect on fire protective and community risk reduction services, and that include significant recommendations herein are focused on:

- A need for the TCFD to strengthen administrative, operational, training, and program related guidelines.
- A need to complete and review required recordkeeping such as fire reports and training records. CPSM was not able to complete a full analysis of response and workload data during our data analysis because fire reports were not complete and entered into the records management system for 2020 and 2021.
- TCFD facilities, optimum facility locations, and what resources are deployed from each facility.
- The aging TCFD fleet.
- Not all TCFD firefighters, fire officers, fire inspectors, and fire investigators hold state certifications commensurate with their level or assignment in the organization. CPSM learned members did attend state certification classes, but time lapsed for eligibility to test for the certification.
- The inconsistent manner in which the TCFD performs fire code inspections from year to year.
- Deficiencies in the 2020 ISO–Public Protection Classification report; the ISO report aligns with findings in the CPSM analysis.
- How the department assembles an Effective Response Force to perform critical tasks on the fireground as benchmarked against a national standard.
- The lack of formal, policy driven, emergency scene accountability through a coordinated effort led by the Incident Commander and in accordance with national standards.
- The need to strengthen the ability for all on-scene personnel to communicate or be with a crew who can communicate with the dispatch center, incoming units, and Incident Command.

Earlier in this analysis CPSM recommended the city hire a full-time Fire Marshal, thereby highlighting the importance of this position and the Community Risk Reduction program in the city. With almost 800 occupancies that require fire code inspections, some with elevated risk and high life-safety risk, it is imperative this function be managed day-to-day by a subject matter expert.

CONTEMPORARY FIRE SERVICE LEADERSHIP

Leading and managing a fire department, in a growing city of 35,000, with the community risks Tooele has, requires a well-versed and experienced person. The role includes program oversight such as training and education of members, fleet maintenance and replacement, facility maintenance, understanding the ISO report and devising a plan to correct deficiencies, personnel management to include member relations and recruitment and retention, emergency operational response, logistical support, and other functions.

The role of today's fire chief is complex and multifaceted. It is no longer simply about organizing and commanding a reactionary force to suppress fires. Today's Fire Chief must fill these many roles:

- **Community Ambassador**. Community ambassadors work with their community. They begin by getting to know the community and the community knowing them. They represent fire and emergency services to the community, serve as spokespersons, share information, and are the symbolic leader to represent the department in the community.
- **Futurist**. Futurists have their eyes on the horizon. They anticipate policy and political issues and keep abreast of industry innovations, NFPA standards, and industry best practices in the fire service. They anticipate change and plan for it.
- **Strategist**. Strategists work with appointed and elected officials, and community leaders. They move the department to a strategic deployment and operation level rather than a reactionary service. Strategists can articulate the needs of the department based on facts and not emotion.
- **Negotiator**. The contemporary chief negotiates and represents the department with other agencies, within the jurisdictional entities, and with members. Negotiators must be willing and able to be a part of a negotiating team, articulate and argue a point of view, seek a middle ground, and sell agreement to others, particularly their members. Negotiators are not everyone's friends but rather they are their leader.
- **Lobbyist**. A contemporary chief must be as a lobbyist with their local government, state, and various other entities that affect the department. Examples may be the through State Chief's Associations, International Association of Fire Chiefs, National Fire Protection Agency, the National Volunteer Fire Council, accrediting bodies, and funding organizations such as the Federal Emergency Management Agency.
- **Navigator**. Navigators first help others focus on the end results and desired outcomes and then guide the organization through obstacles at the department level, community level, chief administrative officer level, and the elected body level. Navigators get out ahead of issues and develop plans in advance rather than last minute.
- **Champion**. Champions are boosters of the fire and emergency services. They look at ways to get others to believe in the department and inspire others to act in support of its mission. They make the department desirable for new membership and retaining current members.

Recommendations:

- Based on the findings in this analysis, that the city is a desirable place to live and will continue to grow with future residential and commercial development, and that the expected growth will increase response demand and bring new building and density risks to the city, and as the Tooele City Code codifies the TCFD as an administrative department of the city, and the Fire Chief position as a department head within the city government, and that the Mayor has direct supervision and responsibility over operations in the Fire Department, CPSM recommends the city consider hiring a full-time Fire Chief to lead and manage the TCFD.
- In addition to formal education requirements deemed appropriate by the city's Human Resources Director commensurate with the position, the Fire Chief candidate should have at minimum the following Utah Fire and Rescue Academy state certifications when hired:
  - Haz-Mat Awareness and Haz-Mat Operations.
  - Firefighter I and II.
  - Wildland Firefighter I and II.
  - Emergency Vehicle Operator Course.
  - Fire Officer I and II.
- CPSM does not recommend the minimization or deletion of the current succession of elected volunteer senior level officers (Fire Chief, Assistant Fire Chiefs) as these positions are needed to facilitate a contemporary fire department. What CPSM does recommend is the current Volunteer Fire Chief position be reclassified as the Deputy Fire Chief (Operations Chief) and the two Assistant Fire Chief positions remain intact. CPSM further recommends the full-time Fire Chief work with the Human Resources Director and develop job descriptions for these positions and all other officer and program positions the full time Fire Chief deems necessary while utilizing the certification recommendations already discussed in this analysis.
- CPSM also recommends if the city chooses to move forward this recommendation and the recommendation to hire a full-time Fire Marshal that the full-time Fire Marshal and his/her staff be included in the fire department and report to the full-time Fire Chief.
  - An alternative to hiring two full time positions (Fire Marshal and Fire Chief) is to combine the two positions into one. Under this alternative, The Fire Chief will also act as the City's Fire Marshal carrying out those job duties as well. The candidate should have the minimum education and Utah Fire and Rescue Academy state certifications for each position as outlined herein.

The next figure illustrates the operational organizational chart with a full time Fire Chief position.

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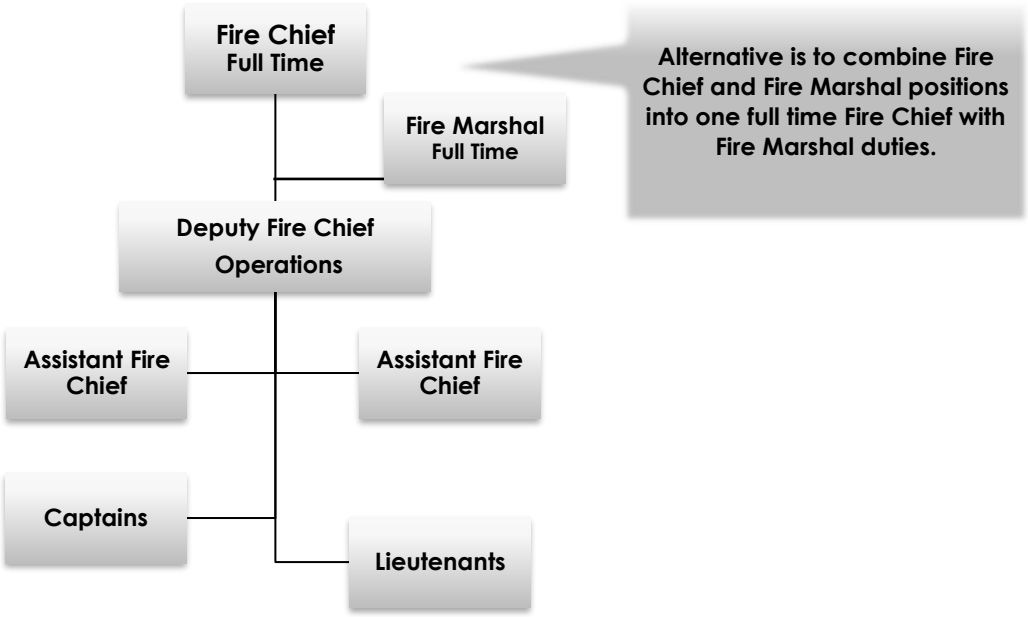
FIGURE 6-1: TCFD Organizational Chart with Full-Time Fire Chief



Moving Forward

CPSM recommends the City and the TCFD strongly consider the recommendations presented in this analysis, remembering the TCFD's strength comes from its volunteer membership and their continuous commitment to serve their community.

The ability to function on the emergency scene at a consistent elevated level, recruitment, retention, training, and adequate facilities and equipment are essential elements to keeping the citizenry and properties of a growing city safe. This analysis focuses on the big picture of fire protective and community risk reduction services in the city. Using this analysis, the City and the TCFD have succinct planning strategies and budget objectives to move forward more clearly.

The following section offers a suggested order of priority of the recommendations outlined in this analysis. CPSM recommends the City and TCFD should consider this suggested order of priority when developing a plan to move forward.

TABLE 6-1: Recommendations In Order Of Priority

Recommendation	Recommendation Action Items
Address the aging and aged-out apparatus fleet. Apparatus components requiring annualized testing either fixed or portable such as fire pumps, aerial ladder and aerial ladder assemblies, ground ladders, self-contained breathing apparatus to include personnel fit-testing, and fire hose should be tested in accordance with manufacturer and industry specifications and standards, and proper records maintained at the department and city, and with the vendor.	■ The TCFD and the City should develop, over a one-year period, a fire apparatus replacement plan that includes age recommendations in accordance with NFPA 1901, *Standard for Automotive Fire Apparatus*. ■ Review CPSM planning objectives regarding apparatus years of service. ■ Strongly consider recommendations made for refurbishment, replacement, and removal from service. ■ Strongly recommend the City and TCFD follow the fleet replacement plan as provided in Table 3-4. ■ Develop a funding strategy to address aging fleet/apparatus equipment issues.
Address facility recommendations. The city must choose a strategy for optimizing response coverage through either a two-station model (Current Station 1 and proposed Station 3) or three-station model (relocated Station 1, current Station 2, proposed Station 3) as presented in this analysis.	■ The city should construct Station 3 in its entirety through planned Phase III as a full project. ■ The city needs to consider future fire facility planning and funding that potentially relocates Station 1 to the south and west of its current location so as to provide deployment coverage to these areas of the city.
Immediately address the lack of emergency scene firefighter accountability.	■ CPSM recommends the TCFD immediately develop a personnel accountability guideline that incorporates individual and apparatus accountability tags as well as accountability boards in all apparatus and command vehicles. The personnel accountability guideline should incorporate language from NFPA standards 1720, 1500, and 1561.

(Table continued on next page)

Recommendation	Recommendation Action Items
Immediately strengthen the ability for all on-scene personnel to communicate or be with a crew who can communicate with the dispatch center, incoming units, and Incident Command.	■ CPSM strongly recommends the TCFD develop a communications guideline that establishes that no member may operate on the fireground alone, and all members must operate in a crew of at least two, of which one crew member must have a portable radio that is operating on the assigned tactical channel and is in contact with the Incident Commander. It is further recommended each TCFD command vehicle have a bank of portable radios in addition to radios assigned to fire apparatus of sufficient numbers and which can be made available to responding volunteer members on arrival in POVs to augment this communications guideline.
Address the deficiencies in training and state certifications for all levels of the fire department.	■ CPSM recommends the TCFD Fire Chief work with the city Human Resources Director and draft and implement, over an immediate six-month period, formal Standard Operating Guidelines for training that includes the following positions: combat firefighters, apparatus driver/operators, lieutenants, captains, chief officers, instructors, fire inspectors, fire investigators, and those involved in technical rescue response.

(Table continued on next page)

Recommendation	Recommendation Action Items
Consider funding and hiring a full-time Fire Marshal. Community Risk Reduction is a city-wide public safety effort that includes fire prevention inspections and fire code enforcement, public safety education, and investigation of fires. The current fire inspection program has certain state and city legislated requirements, and the current fire prevention inspection and fire code enforcement functions are not backed by a plan to meet the growing fire inspection demands and are not consistently administered and managed, as outlined in this analysis.	■ Develop a job description as outlined in the CPSM recommendation. ■ Assign the Fire Marshal position to the Community Development Department in the near term and until other recommendations in this analysis are evaluated and implemented. ■ In conjunction with the hiring of a full-time Fire Marshal, CPSM recommends the city develop a fire prevention occupancy inspection plan in accordance with Chapter 5-1-8(2) of the City Code that specifies, by occupancy type and occupancy address, the frequency of fire inspections. ■ Maintain the current cadre of part-time certified Fire Inspectors to assist the Fire Marshal in carrying out the fire inspection plan. It is also recommended the part-time fire inspector cadre be expanded to four positions and that at least two of these inspectors be certified by the Utah Fire and Rescue Academy as Fire Investigators so that trained and certified fire investigators are available to respond to TCFD fire incidents to determine the cause and origin of fires.

(Table continued on next page)

Recommendation	Recommendation Action Items
Consider funding and hiring a full-time Fire Chief. Based on the findings in this analysis, namely that Tooele is a desirable place to live and will continue to grow with future residential and commercial development, and that the expected growth will increase response demand and bring new building and density risks to the city, and as the Tooele City Code codifies the TCFD as an administrative department of the city and the Fire Chief position as a department head within the city government, and that the Mayor has direct supervision and responsibility over operations in the Fire Department, CPSM recommends the city consider hiring a full-time Fire Chief to lead and manage the TCFD. An alternative approach is to combine the Fire Chief and Fire Marshall positions into one full time fire administrator responsible for fire administrative and operational components as well as Community Risk Reduction.	■ Develop a job description as outlined in the CPSM recommendation. ■ CPSM does not recommend the minimization or deletion of the current succession of elected volunteer senior level officers (Fire Chief, Assistant Fire Chiefs) as these positions are needed to facilitate a contemporary fire department. What CPSM does recommend is the current Volunteer Fire Chief position be reclassified as the Deputy Fire Chief (Operations Chief) and the two Assistant Fire Chief positions remain intact. ■ CPSM further recommends the full-time Fire Chief work with the Human Resources Director and develop job descriptions for these positions and all other officer and program positions the full-time Fire Chief deems necessary while utilizing the certification recommendations already discussed in this analysis.
Recommend revising the current response model to address how the department assembles an Effective Response Force to perform critical tasks on the fireground as benchmarked against the NFPA 1720 national standard.	■ CPSM recommends the TCFD adopt one or more of the response models outlined herein to ensure the most effective and immediate use of response resources and the safety of the public and firefighters. ■ CPSM also recommends the TCFD develop a guideline that outlines the use of the Active911 wireless phone platform and make this system mandatory for all responders who have access to a wireless phone to ensure accountability of all responders. ■ CPSM also recommends the TCFD migrate to a response model where apparatus responds with a minimum of three personnel, that is, a qualified driver/operator, an officer, and a qualified/certified firefighter.

(Table continued on next page)

Recommendation	Recommendation Action Items
Address the deficiencies in the current ISO-PPC report to the extent the city and TCFD are able to. *Many deficiencies will improve immediately when other recommendations listed herein are addressed.*	■ CPSM recommends the city and the TCFD develop a joint plan to address deficiencies in the current ISO Fire Sevice Rating Schedule review that was effective June 2020 and as outlined in this analysis regarding Fire Department Deployment Analysis, Company Personnel, Training (Facilities and Use, Company Training, New Driver and Operator Training, Pre-Fire Planning Inspection), and Water Supply (Inspection and Flow Testing).
CPSM recommends the City conduct a comprehensive review of all fire protection service agreements.	■ This review should include the development of new agreements with municipal and special district fire departments that the city currently provides or receives mutual aid to and from where a mutual aid agreement does not exist. ■ The new agreements should define service level response outside of a fire department's respective area and reciprocal equipment, or services for these fire protection responses and services the city will provide and receive. ■ CPSM further recommends that each agreement have a sunset date that will trigger review and updating to address changes in fire protection services in Tooele City and those municipalities and special districts the city has an agreement with.

(Table continued on next page)

Recommendation	Recommendation Action Items
Review and revise TCFD Standard Operating Guidelines.	■ The TCFD should label each SOG as follows: □ Date approved/implemented. □ Date revised. □ Fire Chief Signature. □ Label Operational SOGs as "O" with a corresponding SOG number (O-1, O-2, etc.). □ Label Administrative SOGs as "A" with a corresponding SOG number (A-1, A-2, etc.). ■ The TCFD should incorporate where applicable City Code of Ordinances in references. ■ The TCFD should work with the city's Human Resources Director, Finance Director, and other city departments as appropriate and incorporate city human resources, fiscal policies, risk management, purchasing, and other guidelines as applicable into TCFD SOGs.

CPSM prepares these analyses for cities, towns, and counties with the goal that they offer substantive information and recommendations for the client and remain active for continuous organizational improvement. This analysis with its recommendations is also meant to be a roadmap to ensure the TCFD provides continuous, efficient, and effective services.

In closing, CPSM thanks the members of the TCFD for their input, discussion, and transparency. CPSM also extends a thank-you to the Mayor and her immediate staff for assisting the project team in the gathering of information from so many sources in and around the city. This made the project a success.

END

SECTION 7. DATA ANALYSIS

This data analysis was prepared as a key component of the study of the Tooele City Volunteer Fire Department (TCFD). This analysis examines all calls for service between January 1, 2019, and December 31, 2019, as recorded in Tooele County's computer-aided dispatch (CAD) system, and the public released National Fire Incident Reporting System (NFIRS).

This analysis is made up of four parts. The first part focuses on call types and dispatches. The second part explores the time spent and the workload of individual units. The third part presents an analysis of the busiest hours in the year studied. The fourth and final part provides a response time analysis of the studied agency's units.

During the year covered by this study, the TCFD provided fire and rescue services to an area with an approximate population of 36,000 and which covers an area of 24 square miles. The TCFD operates out of two fire stations. The frontline apparatus includes five brush trucks, four engines, and two ladder trucks.

In 2019, the TCFD responded to 392 calls, of which 67 percent were fire calls. The total workload in 2019 was 779.8 hours. The average response time was 9.3 minutes, the 80th percentile response time was 12.1 minutes, and the 90th percentile response time was 15.2 minutes.

METHODOLOGY

In this report, CPSM analyzes calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit (i.e., a unit responding to a call). Thus, a call may include multiple runs.

We received CAD data from the Tooele County Sheriff's Communications Center. We also received NFIRS data from the annual NFIRS public data release (PDR), the Utah State Fire Marshal's Office, and the fire department's Emergency Reporting records management system. We classified the calls in a series of steps. We used the NFIRS incident type to identify canceled calls and to assign EMS, motor vehicle accident (MVA), and fire category call types. All calls that occurred outside of the fire zone of the TCFD were assigned as mutual aid.

AGGREGATE CALL TOTALS AND RUNS

In 2019, the TCFD responded to 392 calls. Of these, 18 were structure fire calls and 29 were outside fire calls.

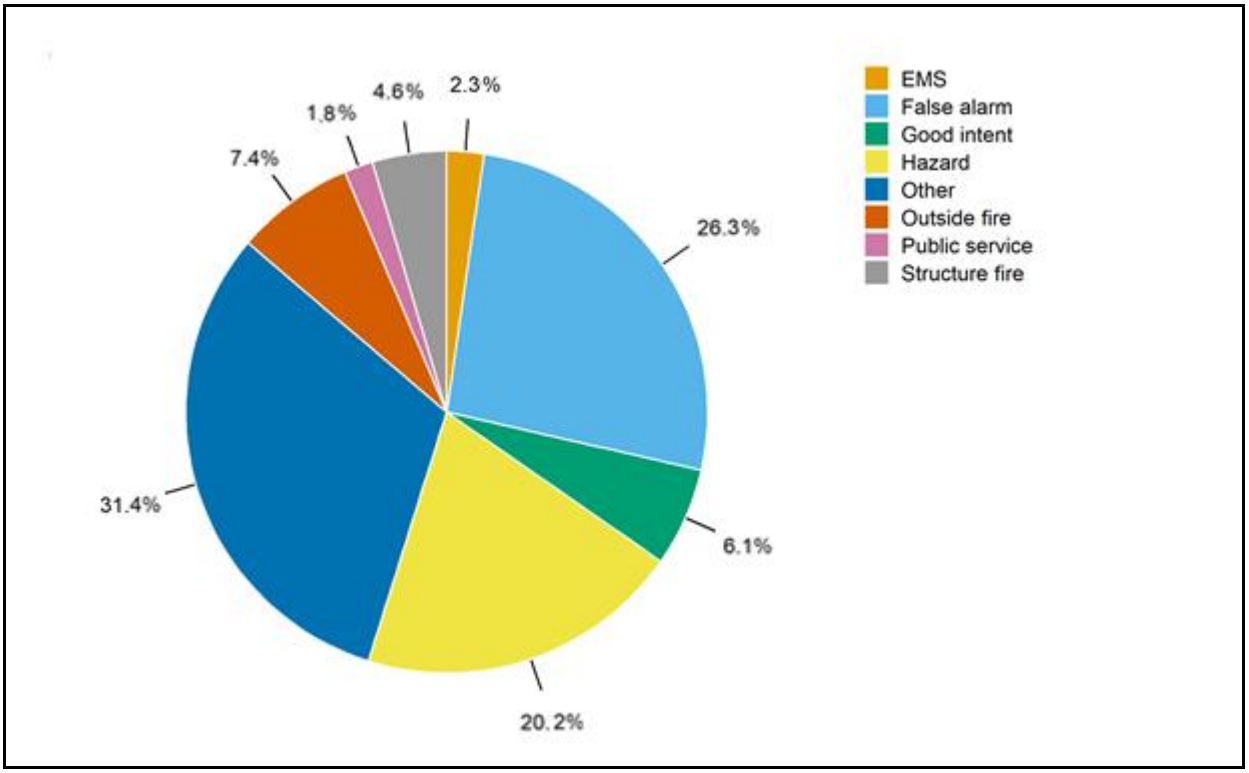
Calls by Type

The following table and figure show the number of calls by call type, average calls per day, and the percentage of calls that fall into each call type category for the 12 months studied.

TABLE 7-1: Call Types

Call Type	Number of Calls	Calls per Day	Call Percentage
False alarm	103	0.3	26.3
Good intent	24	0.1	6.1
Hazard	79	0.2	20.2
Outside fire	29	0.1	7.4
Public service	7	0.0	1.8
Structure fire	18	0.0	4.6
Fire Total	**260**	**0.7**	**66.3**
EMS Total	**9**	**0.0**	**2.3**
Canceled	110	0.3	28.1
Fire mutual aid	13	0.0	3.3
Total	**392**	**1.1**	**100.0**

FIGURE 7-1: Calls by Type



Observations:

- In 2019, TCFD responded to an average of 1.1 calls per day, including 0.3 canceled calls per day.
- EMS calls for the year totaled 9 (2 percent of all calls), an average of fewer than 0.2 calls per week.
- Fire calls for the year totaled 260 (66 percent of all calls), or an average of 0.7 calls per day.
- Other calls (including mutual aid and canceled) for the year totaled 123 (31 percent of all calls), or an average of 0.3 calls per day.
  - 8 canceled calls were also outside the city.
  - The 13 mutual aid calls included: a hazard call, a motor vehicle accident call, 6 outside fire calls, 2 public service calls, and 3 structure fire calls.
- False alarm calls were the largest category of fire calls at 26 percent of total calls (39 percent of fire calls), an average of 0.3 calls per day.
- Structure and outside fire calls combined made up 12 percent of total calls (18 percent of fire calls), or an average of 0.1 calls per day, or one call every eight days.

Calls by Type and Duration

The following table shows the duration of calls by type using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and more than two hours.

TABLE 7-2: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	More Than Two Hours	Total
False alarm	58	30	14	1	103
Good intent	12	9	2	1	24
Hazard	35	24	13	7	79
Outside fire	10	9	6	4	29
Public service	3	3	1	0	7
Structure fire	5	8	3	2	18
Fire Total	**123**	**83**	**39**	**15**	**260**
EMS Total	5	2	2	0	9
Canceled	86	15	8	1	110
Mutual aid	2	5	4	2	13
Total	**217**	**105**	**52**	**18**	**392**

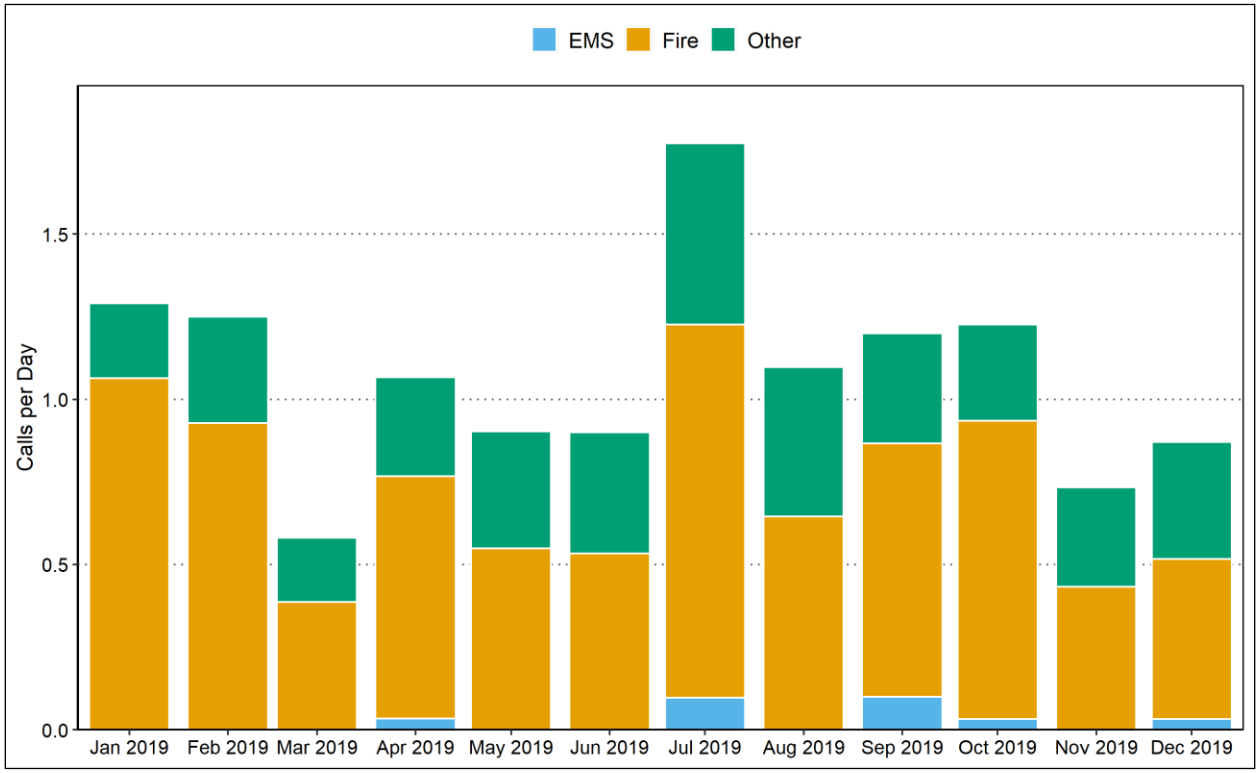
Observations:

- A total of 206 fire calls (79 percent) lasted less than one hour, 39 fire calls (15 percent) lasted one to two hours, and 15 fire calls (6 percent) lasted two or more hours.
- A total of 88 false alarm calls (85 percent) lasted less than one hour, 14 false alarm calls (14 percent) lasted one to two hours, and 1 false alarm call (1 percent) lasted two or more hours.
- A total of 19 outside fire calls (66 percent) lasted less than one hour, 6 outside fire calls (21 percent) lasted one to two hours, and 4 outside fire calls (14 percent) lasted two or more hours.
- A total of 13 structure fire calls (72 percent) lasted less than one hour, 3 structure fire calls (17 percent) lasted one to two hours, and 2 structure fire calls (11 percent) lasted two or more hours.
- TCFD responded to 54 fire calls that lasted more than one hour. This was approximately 0.1 calls per day or one call every 7 days.

Average Calls by Month and Hour of Day

The following figure shows the monthly variation in the average daily number of calls handled by TCFD in 2019. Similarly, the subsequent figure illustrates the average number of calls received each hour of the day over the year.

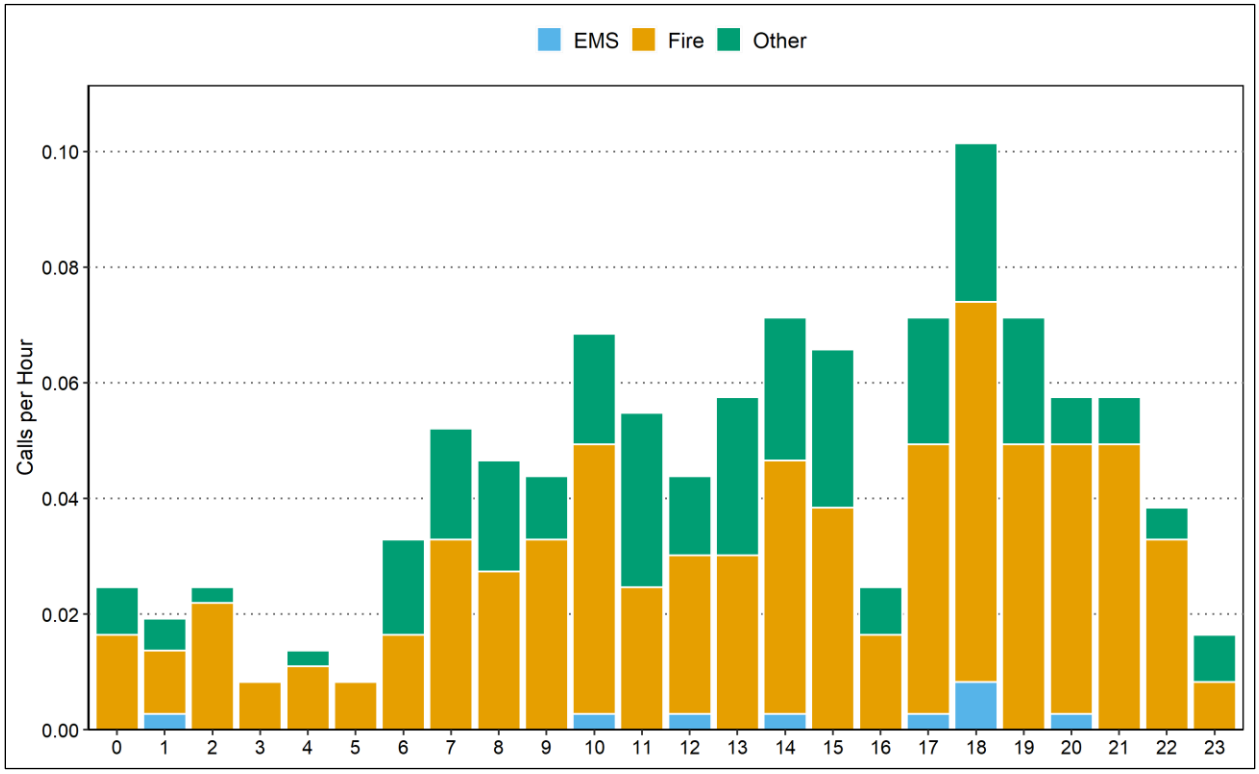
FIGURE 7-2: Average Calls by Month



Observations:

- Average fire calls per day ranged from 0.4 in March 2019 to 1.1 in July 2019.
- Average EMS and other calls combined per day ranged from 0.2 in both January and March 2019 to 0.6 in July 2019.
- Average calls per day overall ranged from 0.6 in March 2019 to 1.8 in July 2019.

FIGURE 7-3: Calls by Hour of Day



Observations:

- Average calls per hour overall ranged from fewer than 0.01 between 3:00 a.m. and 4:00 a.m. and between 5:00 a.m. and 6:00 a.m. to 0.1 between 6:00 p.m. and 7:00 p.m.

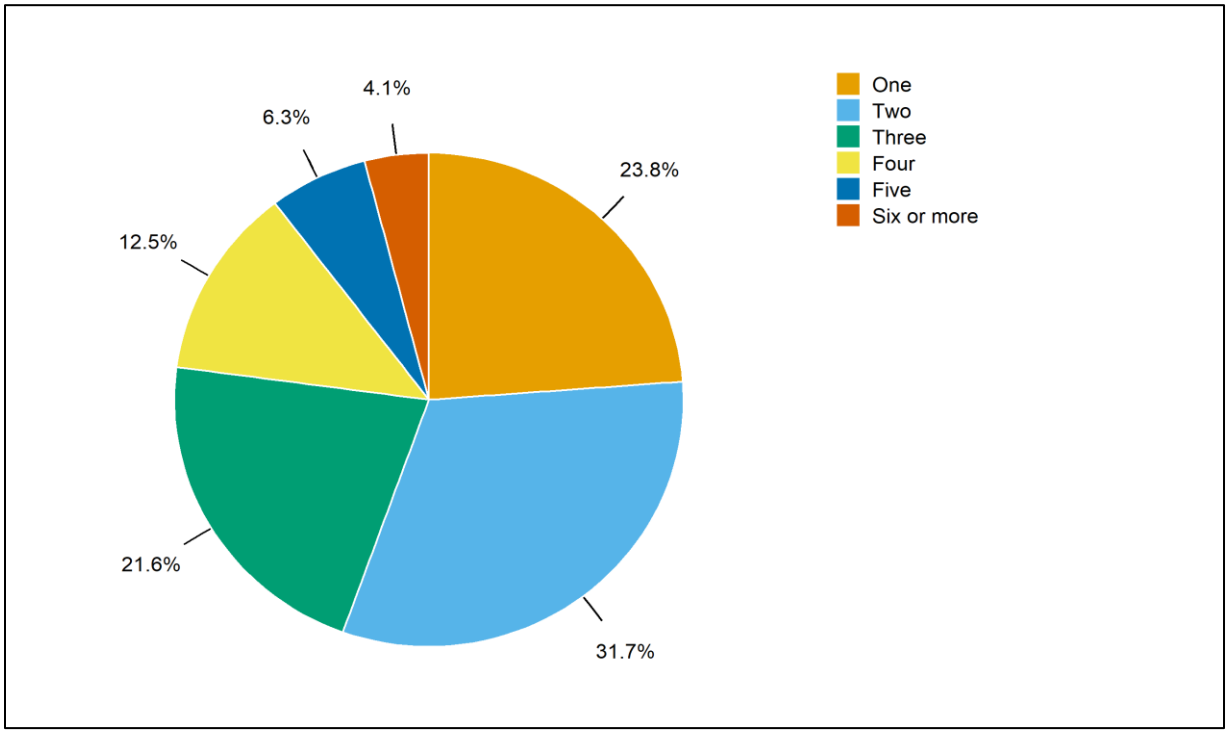
Units Arriving at Calls

The following table and figure detail the number of calls with one, two, three, four, five, and six or more units arriving at a call, broken down by call type. In this section, we limit ourselves to calls where a unit arrives. There were no arriving units for 71 canceled and 2 false alarm calls. A similar analysis focusing on arriving fire suppression units is included in Attachment II.

TABLE 7-3: Calls by Call Type and Number of Arriving Units

Call Type	Number of Units						Total Calls
	One	Two	Three	Four	Five	Six or More	
False alarm	26	45	19	6	3	1	100
Good intent	4	8	5	5	0	2	24
Hazard	11	31	24	8	4	1	79
Outside fire	2	3	7	8	7	2	29
Public service	1	1	2	3	0	0	7
Structure fire	0	2	3	4	4	5	18
Fire Total	**44**	**90**	**60**	**34**	**18**	**11**	**257**
EMS Total	**3**	**1**	**2**	**2**	**1**	**0**	**9**
Canceled	24	8	6	2	0	1	41
Mutual aid	5	2	1	2	1	1	12
Total	**76**	**101**	**69**	**40**	**20**	**13**	**319**
Percentage	**23.8**	**31.7**	**21.6**	**12.5**	**6.3**	**4.1**	**100.0**

FIGURE 7-4: Calls by Number of Arriving Units



Observations:

Overall

- On average, 2.6 units arrived at all calls; for 24 percent of calls, only one unit arrived.
- Overall, three or more units arrived at 45 percent of calls.

EMS

- On average, 2.7 units arrived per EMS call.
- For EMS calls, one unit arrived 33 percent of the time, two units arrived 11 percent of the time, and three or more units arrived 56 percent of the time.

Fire

- On average, 2.8 units arrived per fire call.
- For fire calls, one unit arrived 17 percent of the time, two units arrived 35 percent of the time, and three or more units arrived 48 percent of the time.
- For outside fire calls, three or more units arrived 83 percent of the time.
- For structure fire calls, three or more units arrived 89 percent of the time.

WORKLOAD: RUNS AND TOTAL TIME SPENT

The workload of each unit is measured in two ways: runs and deployed time. The deployed time of a run is measured from the time a unit is dispatched through the time the unit is cleared. Because multiple units respond to some calls, there are more runs than calls and the average deployed time per run varies from the total duration of calls.

Runs and Deployed Time – All Units

Deployed time, also referred to as deployed hours, is the total deployed time for all units deployed on all runs. Table 7-4 shows the total deployed time, both overall and broken down by type of run, for all TCFD units in 2019. Table 7-5 and Figure 7-5 present the average deployed minutes by hour of day.

TABLE 7-4: Annual Runs and Deployed Time by Run Type

Call Type	Deployed Minutes per Run	Annual Hours	Percent of Total Hours	Deployed Minutes per Day	Annual Runs	Runs per Day
False alarm	32.7	146.4	18.8	24.1	269	0.7
Good intent	33.0	47.8	6.1	7.9	87	0.2
Hazard	48.5	181.0	23.2	29.8	224	0.6
Outside fire	57.1	130.3	16.7	21.4	137	0.4
Public service	30.1	11.0	1.4	1.8	22	0.1
Structure fire	76.6	128.9	16.5	21.2	101	0.3
Fire Total	**46.1**	**645.5**	**82.8**	**106.1**	**840**	**2.3**
EMS Total	**42.7**	**19.2**	**2.5**	**3.2**	**27**	**0.1**
Canceled	25.2	71.3	9.1	11.7	170	0.5
Mutual aid	67.3	43.8	5.6	7.2	39	0.1
Other Total	**33.0**	**115.1**	**14.8**	**18.9**	**209**	**0.6**
Total	**43.5**	**779.8**	**100.0**	**128.2**	**1,076**	**2.9**

Observations:

Overall

- The total deployed time for the year was 779.8 hours. The daily average was 128.2 minutes for all units combined.
- There were 1,076 runs, including 170 runs dispatched for canceled calls and 39 runs dispatched for mutual aid calls. The daily average was 2.9 runs.

EMS

- EMS runs accounted for 2 percent of the total workload (3 percent of total runs).
- The average deployed time for EMS runs was 42.7 minutes. The deployed time for all EMS runs averaged 3.2 minutes per day.

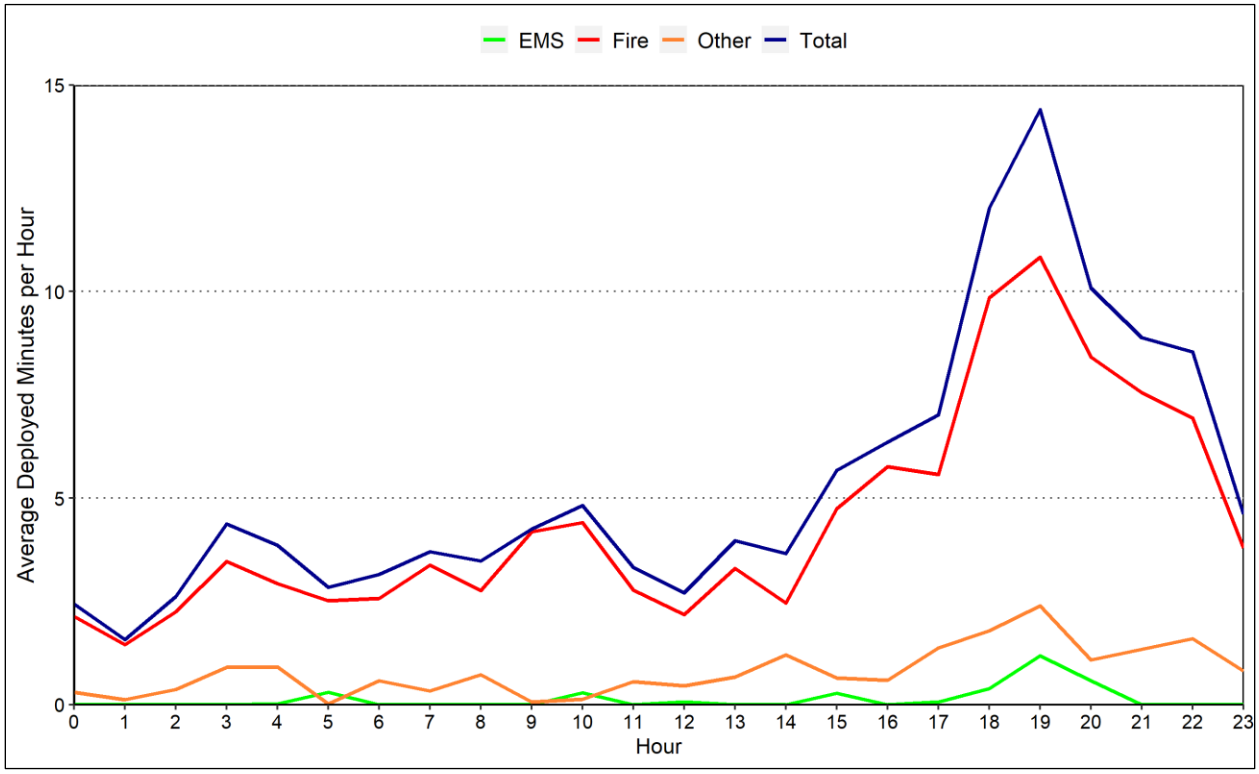
Fire

- Fire runs accounted for 83 percent of the total workload.
- The average deployed time for fire runs was 46.1 minutes. The deployed time for all fire runs averaged 106.1 minutes per day.
- There were 238 runs for structure and outside fire calls combined (22 percent of total runs), with a total workload of 259.2 hours. This accounted for 33 percent of the total workload.
- The average deployed time for outside fire runs was 57.1 minutes per run, and the average deployed time for structure fire runs was 76.6 minutes per run.

TABLE 7-5: Average Deployed Minutes by Hour of Day

Hour	EMS	Fire	Other	Total
0	0.0	2.1	0.3	2.4
1	0.0	1.4	0.1	1.6
2	0.0	2.2	0.4	2.6
3	0.0	3.5	0.9	4.4
4	0.0	2.9	0.9	3.9
5	0.3	2.5	0.0	2.8
6	0.0	2.6	0.6	3.2
7	0.0	3.4	0.3	3.7
8	0.0	2.8	0.7	3.5
9	0.0	4.2	0.1	4.3
10	0.3	4.4	0.1	4.8
11	0.0	2.8	0.6	3.3
12	0.1	2.2	0.5	2.7
13	0.0	3.3	0.7	4.0
14	0.0	2.5	1.2	3.7
15	0.3	4.7	0.6	5.7
16	0.0	5.8	0.6	6.4
17	0.1	5.6	1.4	7.0
18	0.4	9.8	1.8	12.0
19	1.2	10.8	2.4	14.4
20	0.6	8.4	1.1	10.1
21	0.0	7.5	1.3	8.9
22	0.0	6.9	1.6	8.5
23	0.0	3.8	0.8	4.6
Daily Avg.	**3.2**	**106.1**	**18.9**	**128.2**

FIGURE 7-5: Average Deployed Minutes by Hour of Day



Observations:

- Average deployed time peaked between 7:00 p.m. and 8:00 p.m., averaging 14.4 minutes.
- Average deployed time was lowest between 1:00 a.m. and 2:00 a.m., averaging 1.6 minutes.

Workload by Location

Table 7-6 breaks down the workload of TCFD by the location of the call. Table 7-7 provides further detail on the workload associated with structure and outside fires calls, also broken down by location. Table 7-7 includes structure and outside fires that are grouped under mutual aid in previous tables.

TABLE 7-6: Annual Workload by Location

Location	Calls	Pct. Annual Calls	Runs	Runs Per Day	Deployed Minutes Per Run	Annual Hours	Pct. Annual Work	Deployed Minutes Per Day
Tooele	371	94.6	1,029	2.8	42.8	733.8	94.1	120.6
Erda	10	2.6	23	0.1	50.0	19.2	2.5	3.2
Tooele County	6	1.5	8	0.0	111.4	14.8	1.9	2.4
Other	5	1.3	16	0.0	44.8	11.9	1.5	2.0
Total	**392**	**100.0**	**1,076**	**2.9**	**43.5**	**779.8**	**100.0**	**128.2**

TABLE 7-7: Structure and Outside Fire Runs by Location

Location	Structure Fire Runs	Structure Fires Deployed Min. per Run	Outside Fire Runs	Outside Fires Deployed Min. per Run	Hours for Structure and Outside Fires	Pct. of Structure and Outside Fire Workload
Tooele	101	76.6	137	57.1	259.2	88.2
Erda	0	NA	10	90.9	15.2	5.2
Tooele County	2	95.4	2	290.1	12.9	4.4
Other	3	68.2	6	31.5	6.6	2.2
Total	**106**	**76.7**	**155**	**61.3**	**293.9**	**100.0**

Observations:

Tooele City

- Total deployed time for the year was 733.8 hours or 94.1 percent of the total annual workload. The daily average was 120.6 minutes for all units combined.
- There were 1,029 runs, including 162 runs dispatched for canceled calls. The daily average was 2.8 runs.

Erda

- Total deployed time for the year was 19.2 hours or 2.5 percent of the total annual workload. The daily average was 3.2 minutes for all units combined.
- There were 23 runs, including 6 and 17 runs dispatched for canceled and mutual aid calls, respectively.

Tooele County (Unincorporated)

- Total deployed time for the year was 14.8 hours or 1.9 percent of the total annual workload. The daily average was 2.4 minutes for all units combined.
- There were 8 runs, including 2 and 6 runs dispatched for canceled and mutual aid calls, respectively.

Other

- Total deployed time for the year was 11.9 hours or 1.5 percent of the total annual workload. The daily average was 2.0 minutes for all units combined.
- There were 16 runs dispatched for mutual aid calls.

Workload by Unit

Table 7-8 provides a summary of each unit's workload overall. Tables 7-9 and 7-10 provide a more detailed view of workload, showing each unit's runs broken out by run type (Table 7-9) and the resulting daily average deployed time broken out by run type (Table 7-10).

TABLE 7-8: Call Workload by Unit

Station	Unit	Unit Type	Deployed Minutes per Run	Total Hours	Total Pct.	Deployed Minutes per Day	Total Runs	Runs per Day
1	BR217	Brush	55.4	57.2	7.3	9.4	62	0.2
	BR219	Brush	49.9	10.8	1.4	1.8	13	0.0
	EN214	Engine	56.8	2.8	0.4	0.5	3	0.0
	EN220	Engine	49.8	60.6	7.8	10.0	73	0.2
	EN221	Engine	35.0	152.1	19.5	25.0	261	0.7
	Total		**41.3**	**283.6**	**36.4**	**46.6**	**412**	**1.1**
2	BR215	Brush	25.6	2.1	0.3	0.4	5	0.0
	BR216	Brush	68.0	10.2	1.3	1.7	9	0.0
	BR223	Brush	56.7	42.5	5.5	7.0	45	0.1
	LAD222	Ladder	42.0	31.5	4.0	5.2	45	0.1
	LAD224	Ladder	72.2	15.6	2.0	2.6	13	0.0
	Total		**52.3**	**102.0**	**13.1**	**16.8**	**117**	**0.3**
Other	CPT204	Captain	49.5	33.0	4.2	5.4	40	0.1
	CPT205	Captain	45.9	28.3	3.6	4.7	37	0.1
	CPT206	Captain	31.2	4.2	0.5	0.7	8	0.0
	CPT207	Captain	37.9	31.6	4.1	5.2	50	0.1
	CPT208	Captain	66.9	16.7	2.1	2.7	15	0.0
	EN210	Res. Engine	8.3	0.1	0.0	0.0	1	0.0
	FC201	Chief	44.1	120.5	15.4	19.8	164	0.4
	FC202	Asst. Chief	42.4	64.3	8.2	10.6	91	0.2
	FC203	Asst. Chief	42.0	64.5	8.3	10.6	92	0.3
	LT210	Lieutenant	39.4	27.6	3.5	4.5	42	0.1
	LT211	Lieutenant	44.9	0.7	0.1	0.1	1	0.0
	LT212	Lieutenant	18.6	0.6	0.1	0.1	2	0.0
	LT213	Lieutenant	32.8	2.2	0.3	0.4	4	0.0
	Total		**43.2**	**394.2**	**50.6**	**64.8**	**547**	**1.5**
Total			**43.5**	**779.8**	**100.0**	**128.2**	**1,076**	**2.9**

TABLE 7-9: Annual Runs by Run Type and Unit

Station	Unit	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Structure Fire	EMS	Cancel	Mutual Aid	Total
1	BR217	1	6	12	21	3	7	0	5	7	62
	BR219	0	1	1	7	1	0	0	2	1	13
	EN214	0	0	0	2	0	1	0	0	0	3
	EN220	12	6	14	6	2	11	4	12	6	73
	EN221	91	20	66	17	4	15	6	40	2	261
	Total	**104**	**33**	**93**	**53**	**10**	**34**	**10**	**59**	**16**	**412**
2	BR215	1	0	2	0	0	0	0	1	1	5
	BR216	1	2	0	6	0	0	0	0	0	9
	BR223	2	6	2	19	1	7	0	4	4	45
	LAD222	10	2	9	2	0	12	2	7	1	45
	LAD224	3	1	0	1	0	7	0	1	0	13
	Total	**17**	**11**	**13**	**28**	**1**	**26**	**2**	**13**	**6**	**117**
Other	CPT204	6	6	11	4	2	2	1	8	0	40
	CPT205	12	3	10	4	0	2	0	6	0	37
	CPT206	2	1	2	0	1	0	0	2	0	8
	CPT207	18	3	13	2	1	3	1	7	2	50
	CPT208	5	0	4	1	0	3	0	2	0	15
	EN210	1	0	0	0	0	0	0	0	0	1
	FC201	52	13	28	16	3	11	5	28	8	164
	FC202	15	5	24	10	3	7	4	21	2	91
	FC203	22	7	20	11	1	9	3	16	3	92
	LT210	14	3	4	8	0	2	1	8	2	42
	LT211	0	0	0	0	0	1	0	0	0	1
	LT212	1	1	0	0	0	0	0	0	0	2
	LT213	0	1	2	0	0	1	0	0	0	4
	Total	**148**	**43**	**118**	**56**	**11**	**41**	**15**	**98**	**17**	**547**
Total		**269**	**87**	**224**	**137**	**22**	**101**	**27**	**170**	**39**	**1,076**

TABLE 7-10: Average Deployed Minutes by Run Type and Unit

Station	Unit	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Structure Fire	EMS	Cancel	Mutual Aid	Total
1	BR217	0.0	0.5	1.2	2.9	0.2	2.1	0.0	0.5	2.0	9.4
	BR219	0.0	0.1	0.1	1.1	0.0	0.0	0.0	0.3	0.1	1.8
	EN214	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.5
	EN220	1.2	0.8	2.1	1.4	0.2	2.0	0.4	0.8	1.3	10.0
	EN221	7.9	1.5	8.0	2.0	0.3	2.4	0.6	2.2	0.1	25.0
	Total	**9.1**	**2.9**	**11.4**	**7.5**	**0.7**	**6.9**	**1.1**	**3.7**	**3.5**	**46.6**
2	BR215	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	BR216	0.1	0.2	0.0	1.4	0.0	0.0	0.0	0.0	0.0	1.7
	BR223	0.3	0.3	0.3	3.4	0.0	1.3	0.0	0.4	0.9	7.0
	LAD222	0.5	0.2	0.7	0.5	0.0	2.6	0.2	0.3	0.1	5.2
	LAD224	0.2	0.2	0.0	0.1	0.0	2.1	0.0	0.0	0.0	2.6
	Total	**1.4**	**0.8**	**1.1**	**5.3**	**0.0**	**6.0**	**0.2**	**0.8**	**1.1**	**16.8**
Other	CPT204	0.5	0.6	1.7	1.0	0.2	0.9	0.2	0.3	0.0	5.4
	CPT205	0.9	0.5	1.9	0.6	0.0	0.3	0.0	0.5	0.0	4.7
	CPT206	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.2	0.0	0.7
	CPT207	1.8	0.4	1.2	0.2	0.2	0.4	0.1	0.7	0.2	5.2
	CPT208	0.3	0.0	1.1	0.0	0.0	1.0	0.0	0.4	0.0	2.7
	EN210	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	FC201	4.9	1.0	4.5	3.0	0.2	3.0	0.6	1.5	1.1	19.8
	FC202	1.6	0.4	3.3	1.4	0.2	1.0	0.4	1.7	0.6	10.6
	FC203	2.1	0.6	2.8	1.6	0.2	1.4	0.4	1.2	0.3	10.6
	LT210	1.3	0.3	0.4	0.8	0.0	0.3	0.2	0.8	0.5	4.5
	LT211	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
	LT212	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	LT213	0.0	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.4
	Total	**13.6**	**4.2**	**17.3**	**8.6**	**1.1**	**8.4**	**1.8**	**7.3**	**2.6**	**64.8**
Total		**24.1**	**7.9**	**29.8**	**21.4**	**1.8**	**21.2**	**3.1**	**11.7**	**7.2**	**128.2**

Observations:

- Station 1 made 412 total runs (1.1 runs per day) and 283.6 total annual deployed hours (46.6 minutes per day).
- Station 2 made 117 total runs (0.3 runs per day) and 102.0 total annual deployed hours (16.8 minutes per day).
- EN221 made the most runs (261 or an average of 0.7 runs per day) and had the highest total annual deployed time (152.1 hours or an average of 25.0 minutes per day).
  - Structure and outside fire calls accounted for 12 percent of runs and 18 percent of total deployed time.
- FC201 made the second most runs (164 or an average of 0.5 runs per day) and had the second-highest total annual deployed time (120.5 hours or an average of 19.8 minutes per day).
  - Structure and outside fire calls accounted for 16 percent of runs and 30 percent of total deployed time.

ANALYSIS OF BUSIEST HOURS

There is significant variability in the number of calls from hour to hour. One special concern relates to the resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Table 7-11 shows the number of hours in the year in which there were zero to three or more calls during the hour. Table 7-12 shows the 10 one-hour intervals which had the most calls during the year. Table 7-13 examines the number of times a call overlapped with another call within the service areas of TCFD.

TABLE 7-11: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	8,382	95.7
1	365	4.2
2+	13	0.1
Total	**8,760**	**100.0**

TABLE 7-12: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
2/14/2019, 6:00 p.m. to 7:00 p.m.	3	9	1.8
7/11/2019, 6:00 p.m. to 7:00 p.m.	2	17	16.5
8/4/2019, 9:00 p.m. to 10:00 p.m.	2	11	6.4
9/25/2019, 6:00 p.m. to 7:00 p.m.	2	7	4.1
4/19/2019, 5:00 p.m. to 6:00 p.m.	2	7	2.4
6/15/2019, 4:00 p.m. to 5:00 p.m.	2	7	2.4
2/17/2019, 10:00 a.m. to 11:00 a.m.	2	6	4.0
1/1/2019, 1:00 a.m. to 2:00 a.m.	2	5	5.2
10/26/2019, 7:00 p.m. to 8:00 p.m.	2	5	1.9
5/1/2019, 8:00 p.m. to 9:00 p.m.	2	4	2.7

Note: Total deployed hours is a measure of the total time spent responding to calls received in the hour. The deployed time from these calls may extend into the next hour or hours. The number of runs and deployed hours includes all units from the studied agencies.

TABLE 7-13: Frequency of Overlapping Calls

Scenario	Number of Calls	Percent of All Calls	Total Hours
No overlapped call	348	97.2	240.4
Overlapped with one call	10	2.8	2.6

Observations:

- During 13 hours (0.1 percent of all hours), two or more calls occurred; in other words, the department responded to two or more calls in an hour roughly once every 28 days.
  - The highest number of calls to occur in an hour was three, which happened once.
- The hour with the most calls was 6:00 p.m. to 7:00 p.m. on February 14, 2019.
  - The hour's 3 calls involved 9 individual dispatches resulting in 1.8 hours of deployed time. These 3 calls included two hazard calls and one false alarm call.
- TCFD never had more than 4 calls in a single day in 2019. There were 4 calls in a day on 8 days during the year.

RESPONSE TIME

In this part of the analysis, we present response time statistics for different call types. We separate response time into its identifiable components. *Dispatch time* is the difference between the time a call is received and the earliest time an agency is dispatched. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch. *Turnout time* is the difference between the earliest dispatch time and the earliest time an agency's unit is en route to a call's location. *Travel time* is the difference between the earliest en route time and the earliest arrival time. *Response time* is the total time elapsed between receiving a call to arriving on scene. For fire calls, we only considered the turnout and travel times, and their summation counts to the total response time.

In this analysis, we included all calls within the primary service areas of TCFD to which at least one unit responded. Canceled and mutual aid calls were excluded. In addition, calls with a total response time of more than 30 minutes were excluded. Finally, we focused on units that had complete time stamps, that is, units with all components recorded, so that we could calculate each segment of response time.

Based on the methodology above, we excluded 13 mutual aid calls, 110 canceled calls, 2 calls where no units recorded a valid on-scene time, 8 calls where the first arriving unit's response time was greater than 30 minutes, and 98 calls where one or more segments of the first arriving unit's response time could not be calculated due to missing or faulty data. As a result, the analysis in this section included 161 calls.

Response Time by Type of Call

Tables 7-14 and 7-15 break down the average, 80th percentile, and 90th percentile response times by call type for all calls in TCFD's jurisdictions. TCFD follows the NFPA 1720 standard that benchmarks both 80th and 90th percentile response times. Figure 7-6 illustrates the components of the average response time by call type. Table 7-16 examines the average, 80th, and 90th response times of the first arriving TCFD units by the time of day (in four-hour intervals).

TABLE 7-14: Average Response Time of First Arriving Unit, by Call Type

Call Type	Dispatch	Average Response Time, Min.			Number of Calls
		Turnout	Travel	Total	
False alarm	2.3	3.4	4.6	10.3	64
Good intent	2.0	3.2	2.9	8.1	17
Hazard	2.8	2.6	3.5	8.9	45
Outside fire	2.1	2.3	4.3	8.7	17
Public service	2.5	2.4	5.6	10.5	6
Structure fire	2.1	2.2	3.1	7.4	9
Fire Total	**2.4**	**2.9**	**4.0**	**9.3**	**158**
EMS Total	**4.3**	**1.8**	**2.2**	**8.3**	**3**
Total	**2.4**	**2.9**	**4.0**	**9.3**	**161**

TABLE 7-15: 80th and 90th Percentile Response Times of First Arriving Unit, by Call Type

Call Type	80th Percentile Response Time, Min.				90th Percentile Response Time, Min.				Number of Calls
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
False alarm	3.3	5.4	7.2	13.1	4.6	6.1	8.3	16.2	64
Good intent	2.9	4.9	4.7	11.1	4.0	5.6	5.5	15.8	17
Hazard	3.3	3.9	4.6	11.5	4.3	4.9	6.2	14.8	45
Outside fire	2.6	2.8	5.3	11.3	3.4	4.0	8.1	12.9	17
Public service	3.6	4.0	8.4	14.8	3.8	4.3	9.6	15.2	6
Structure fire	3.0	4.2	4.4	10.5	3.3	5.0	6.8	11.3	9
Fire Total	**3.3**	**4.3**	**5.8**	**12.1**	**4.0**	**5.5**	**7.3**	**15.2**	**158**
EMS Total	**6.7**	**2.4**	**3.0**	**12.2**	**6.7**	**2.4**	**3.0**	**12.2**	**3**
Total	**3.3**	**4.3**	**5.8**	**12.1**	**4.0**	**5.5**	**7.3**	**15.2**	**161**

FIGURE 7-6: Average Response Time of First Arriving Unit, by Call Type

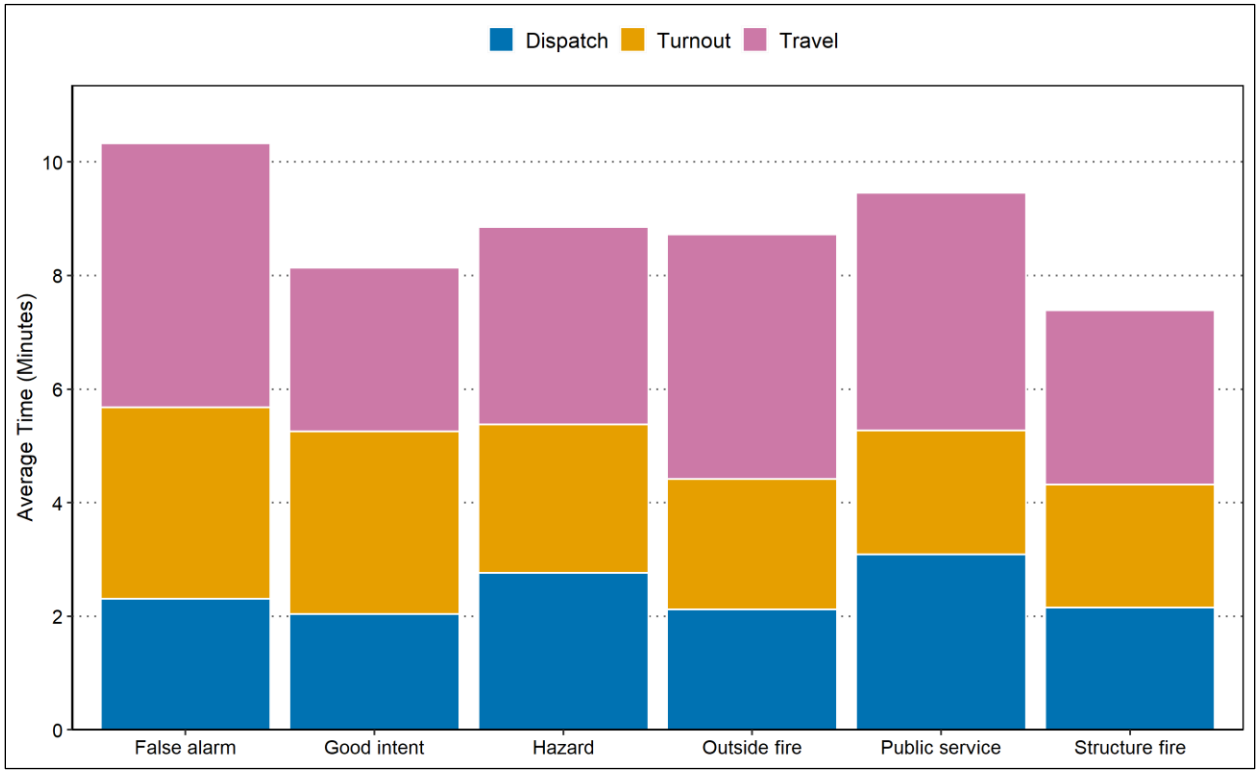


TABLE 7-16: Average, 80th, and 90th Percentile Response Time of First Arriving Unit, by Time of Day

Time of Day	Time in Minutes						Number of Calls
	Dispatch	Turnout	Travel	Response Time	80th Percentile Response Time	90th Percentile Response Time	
0:00 - 3:59	3.0	4.7	5.2	12.8	16.8	18.9	13
4:00 - 7:59	3.0	4.5	4.5	12.1	18.4	19.6	14
8:00 - 11:59	2.3	2.6	3.5	8.5	10.8	12.1	31
12:00 - 15:59	2.7	2.4	3.8	9.0	12.4	15.8	27
16:00-19:59	2.2	2.2	3.8	8.2	10.7	11.8	41
20:00-23:59	2.1	3.0	4.1	9.2	11.8	14.8	35
Total	**2.4**	**2.9**	**4.0**	**9.3**	**12.1**	**15.2**	**161**

Observations:

- The average dispatch time for fire calls was 2.4 minutes
- The average turnout time for fire calls was 2.9 minutes.
- The average travel time for fire calls was 4.0 minutes.
- The average total fire response time for fire calls was 9.3 minutes.
- The average response time was 8.7 minutes for outside fires and 7.4 minutes for structure fires.
- The 80th percentile dispatch time was 3.3 minutes
- The 80th percentile turnout time for fire calls was 4.3 minutes.
- The 80th percentile travel time for fire calls was 5.8 minutes.
- The 80th percentile total response time for fire calls was 12.1 minutes.
- The 80th percentile response time was 11.3 minutes for outside fires and 10.5 minutes for structure fires.
- The 90th percentile dispatch time for fire calls was 4.0 minutes
- The 90th percentile turnout time for fire calls was 5.5 minutes.
- The 90th percentile travel time for fire calls was 7.3 minutes.
- The 90th percentile total response time for fire calls was 15.2 minutes.
- The 90th percentile response time was 12.9 minutes for outside fires and 11.3 minutes for structure fires.

Response Time Distribution

Here, we present a more detailed look at how response times to calls are distributed. The cumulative distribution of total response time for the first arriving TCFD unit to structure and outside fire calls is shown in Figure 7-8 and Table 7-18.

The cumulative percentages here are read in the same way as a percentile. In Figure 7-7, the 80th percentile of 10.7 minutes means that 80 percent of structure and outside fire calls had a response time of 10.7 minutes or less, and the 90th percentile of 12.9 minutes means that 90 percent of structure and outside fire calls had a response time of 12.9 minutes or less. In Table 7-17, the cumulative percentage of 53.8 represents that 53.8 percent of structure and outside fire calls had a response time under 8 minutes.

FIGURE 7-7: Cumulative Distribution of Response Time – First Arriving Unit – Outside and Structure Fires

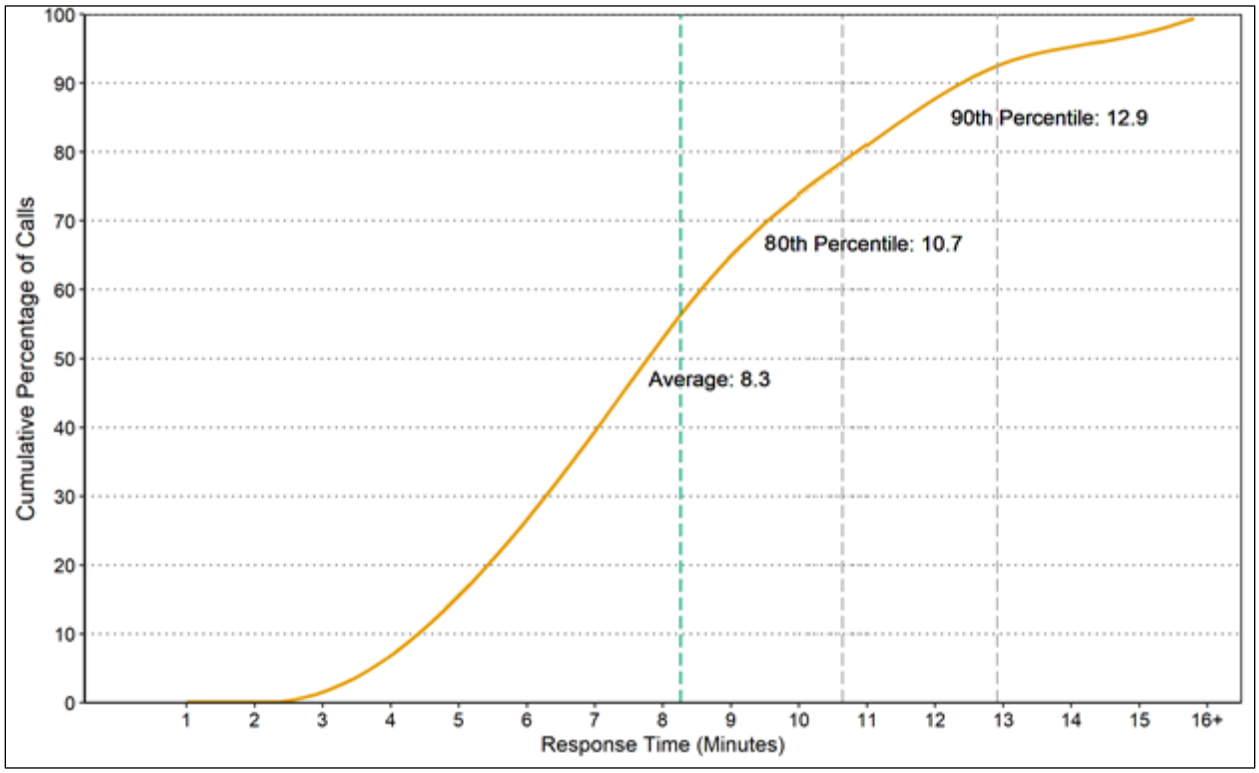


TABLE 7-17: Cumulative Distribution of Response Time – First Arriving Unit – Outside and Structure Fires

Response Time (minute)	Frequency	Cumulative Percentage
1	0	0.0
2	0	0.0
3	0	0.0
4	2	7.7
5	2	15.4
6	3	26.9
7	3	38.5
8	4	53.8
9	3	65.4
10	2	73.1
11	2	80.8
12	2	88.5
13	2	96.2
14	0	96.2
15	0	96.2
16+	1	100.0

Observations:

- For 54 percent of structure and outside fire calls, the response time of the first arriving TCFD unit was less than 8 minutes.

ATTACHMENT I: ACTIONS TAKEN

TABLE 7-18: Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Outside Fire	Structure Fire
Extinguishment by fire service personnel	9	0
Fire control or extinguishment, other	14	11
Information, investigation & enforcement, other	1	0
Investigate	0	2
Investigate fire out on arrival	5	4
Salvage & overhaul	0	1
Total	**29**	**18**

Observations:

- Out of 29 outside fires, 9 were extinguished by fire service personnel, which accounted for 31 percent of outside fires.

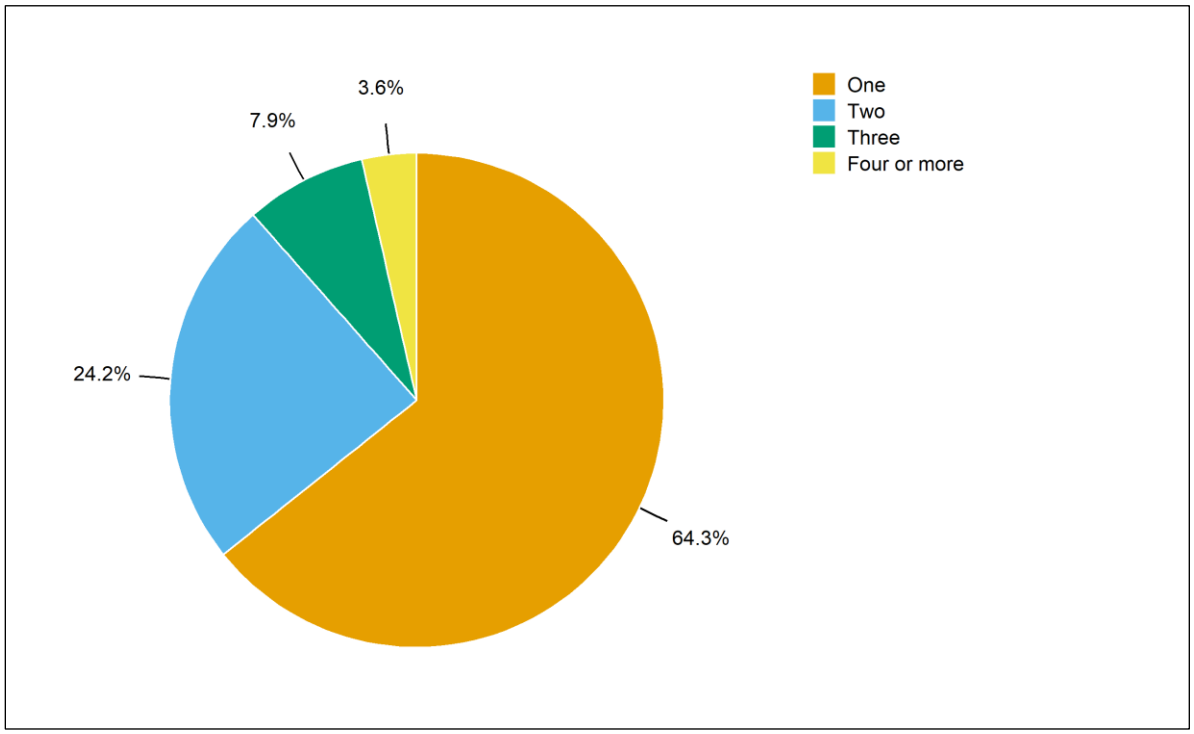
ATTACHMENT II: FIRE SUPPRESSION UNITS ARRIVING AT CALLS

This section repeats the calculations of Table 3 and Figure 4 if only fire suppression units were included.

TABLE 7-19: Calls by Call Type and Number of Arriving Fire Suppression Units

Call Type	Number of Units				Total Calls
	One	Two	Three	Four or More	
False alarm	69	9	0	1	79
Good intent	13	7	1	1	22
Hazard	46	21	1	0	68
Outside fire	5	12	8	2	27
Public service	2	1	2	0	5
Structure fire	5	3	5	5	18
Fire Total	**140**	**53**	**17**	**9**	**219**
EMS Total	**0**	**5**	**0**	**0**	**5**
Canceled	16	1	1	0	18
Mutual aid	6	2	2	0	10
Total	**162**	**61**	**20**	**9**	**252**
Percentage	**64.3**	**24.2**	**7.9**	**3.6**	**100.0**

FIGURE 7-8: Calls by Number of Arriving Fire Suppression Units



ATTACHMENT III: FIRE MUTUAL AID

Table 7-20 details the total calls that were aid given by TCFD to other agencies in 2019. All canceled calls were included.

TABLE 7-20: Mutual Aid Given

Call ID	Date	Receiving Agency	Call Type	Incident City
819027	2019-01-01	RVFD	Structure fire	TC unincorporated
824489	2019-01-25	RVFD	Structure fire	Rush Valley
828012	2019-02-10	NTFD	Outside fire	Pine Canyon
828333	2019-02-12	NTFD	Canceled	Erda
834017	2019-03-09	NTFD	Canceled	Erda
847499	2019-05-01	NTFD	Canceled	Erda
858721	2019-06-13	NTFD	Hazard	Erda
862421	2019-06-28	NTFD	Outside fire	Erda
867304	2019-07-17	SCFD	Outside fire	TC unincorporated
867632	2019-07-18	SCFD	Canceled	TC unincorporated
867787	2019-07-19	NTFD	EMS Assist	Erda
869144	2019-07-25	NTFD	Outside fire	Grantsville
871544	2019-08-03	GCFD	Structure fire	Grantsville
871794	2019-08-04	NTFD	Public service	Pine Canyon
873084	2019-08-10	NTFD	Canceled	Erda
874219	2019-08-15	NTFD	Outside fire	Erda
876325	2019-08-24	NTFD	Canceled	Erda
876725	2019-08-26	NTFD	Outside fire	Erda
882080	2019-09-17	TDFD	Canceled	TC unincorporated
883510	2019-09-23	NTFD	Public service	TC unincorporated
897369	2019-11-22	TRFD	Canceled	TC unincorporated

For calls that occurred in Tooele City in 2019, Table 7-21 shows the number and type of calls where TCFD received aid from other agencies. Here we list all responding agencies based on the CAD data, including both FD and non-FD agencies. The table includes a total of 37 calls and 44 runs (or 44 responses from other agencies).

TABLE 7-21: Mutual Aid Received

Call ID	Date	Responding Agency	Call Type
821488	2019-01-11	NTFD	Good intent
821505	2019-01-11	NTFD	Hazard
824396	2019-01-24	TDFD	Structure fire
824424	2019-01-25	TDFD	Structure fire
827162	2019-02-06	TDFD, IBFD	False alarm
828459	2019-02-12	NTFD	Structure fire
830629	2019-02-22	NTFD	Structure fire
832022	2019-02-28	NTFD	Outside fire
836632	2019-03-21	NTFD	Canceled
840426	2019-04-05	TDFD	Outside fire
842229	2019-04-12	NTFD	Good intent
848265	2019-05-04	TDFD	Structure fire
848459	2019-05-05	TDFD	Canceled
850598	2019-05-13	TDFD	Good intent
853286	2019-05-23	TDFD	Hazard
854546	2019-05-28	TDFD	Structure fire
857729	2019-06-10	GCFD, TDFD	Structure fire
858732	2019-06-13	TDFD	False alarm
859236	2019-06-15	NTFD	Good intent
859373	2019-06-16	TDFD	Good intent
863840	2019-07-03	NTFD	Good intent
863863	2019-07-03	NTFD	Outside fire
863954	2019-07-04	TDFD	Good intent
864336	2019-07-05	TDFD	Canceled
865219	2019-07-09	TDFD	Outside fire
868141	2019-07-21	NTFD	Outside fire
869799	2019-07-27	NTFD	Outside fire
870372	2019-07-30	NTFD	Outside fire
870485	2019-07-30	NTFD, NTFD	Outside fire
873371	2019-08-11	TDFD	Outside fire
874808	2019-08-17	TDFD, SCFD, TRFD, RVFD	Outside fire
877386	2019-08-28	NTFD, GCFD	Structure fire
883590	2019-09-24	NTFD	Hazard
890331	2019-10-23	TDFD	Good intent
891795	2019-10-30	NTFD	Structure fire
892696	2019-11-03	TDFD	Outside fire
895503	2019-11-15	TDFD	Good intent

ATTACHMENT IV: 2019 & 2020 COMPARISON

In this analysis, we examine the historical trends of fire responses based on two years of data for 2019 and 2020 for the Tooele City Fire Department. We present calls by month, unit workload, response time components, and workload by the time of day for both years.

TABLE 7-22: Number of Calls by Month and Year

Month	Number of Calls	
	2019	2020
1	40	30
2	35	37
3	18	45
4	32	31
5	28	33
6	27	47
7	55	64
8	34	46
9	36	47
10	38	41
11	22	40
12	27	37
Total	**392**	**498**

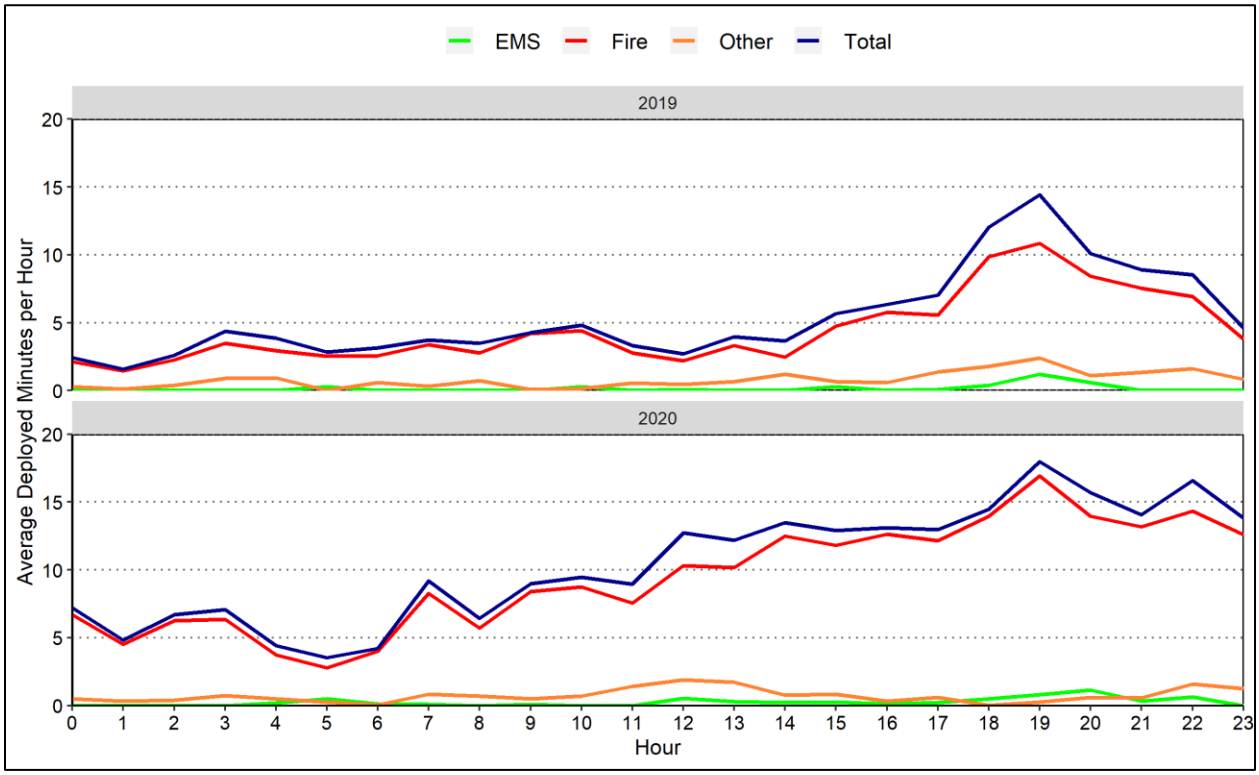
TABLE 7-23: Response Time Components (in Minutes) by Month and Year

Item	2019			2020		
	Average	80th Percentile	90th Percentile	Average	80th Percentile	90th Percentile
Dispatch	2.4	3.3	4.0	3.0	3.8	5.8
Turnout	2.9	4.3	5.5	2.2	3.4	4.7
Travel	4.0	5.8	7.3	3.9	5.9	6.8
Total	9.3	12.1	15.2	9.1	11.6	13.6
Number of Calls	161			279		

TABLE 7-24: Unit Runs and Workload by Year

Station	Unit	Unit Type	2019		2020	
			Hours	Runs	Hours	Runs
1	BR217	Brush	57.2	62	88.2	111
	BR219	Brush	10.8	13	8.4	8
	EN214	Engine	2.8	3	1.4	1
	EN220	Engine	60.6	73	4.3	3
	EN221	Engine	152.1	261	102.6	96
	Total		**283.6**	**412**	**406.0**	**510**
2	BR215	Brush	2.1	5	8.0	12
	BR216	Brush	10.2	9	34.7	34
	BR223	Brush	42.5	45	76.0	83
	LAD222	Ladder	31.5	45	54.6	71
	LAD224	Ladder	15.6	13	59.1	50
	Total		**102.0**	**117**	**232.4**	**250**
Other	CPT204	Captain	33.0	40	35.9	21
	CPT205	Captain	28.3	37	62.4	49
	CPT206	Captain	4.2	8	64.9	66
	CPT207	Captain	31.6	50	9.8	9
	CPT208	Captain	16.7	15	13.2	14
	CPT209	Captain	0.0	0	19.3	22
	EN210	Res. Engine	0.1	1	0.0	0
	FC201	Chief	120.5	164	243.1	268
	FC202	Asst. Chief	64.3	91	199.4	213
	FC203	Asst. Chief	64.5	92	214.7	241
	LT210	Lieutenant	27.6	42	0.5	1
	LT211	Lieutenant	0.7	1	0.0	0
	LT212	Lieutenant	0.6	2	3.2	4
	LT213	Lieutenant	2.2	4	14.3	17
	Total		**394.2**	**547**	**880.7**	**925**
Total			**779.8**	**1,076**	**1,519.1**	**1,685**

FIGURE 7-9: Average Deployed Minutes by Hour of Day and Year



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